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- 1926 NEWMAN, L. H., Salisbury Road, Bexley, Kent. *l.*
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- 1930 PEARMAN, Capt. A., Elm Cottage, Purley, Surrey. *l.*
- 1908 PENNINGTON, F., Oxford Mansions, Oxford Circus, W. 1. *l.*
- 1928 PERKINS, J. F., F.R.E.S., 19, Courtfield Gardens, S.W.5. *h.*
- 1933 PEYTON, A. G., Holly Bank, Napleton Road, Ramsgate. *l.*
- 1933 PINHEY, E. C. S., 36, Wetherby Mansions, Earl's Court Square, S.W.5. *ent.*
- 1933 PINNIGER, E. B., 19, Endlebury Road, Chingford, E.4. *p, l.*
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- 1925 PORTSMOUTH, G. B.
- 1912 POULTON, PROF. Sir E. B., D.SC., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.R.E.S., "Wykeham House," Oxford. (*Hon. Member.*)

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ELECTION.

- 1927 PRATT, W. B., 10, Lion Gate Gardens, Richmond Lane, Richmond.
- 1897 PREST, E. E. B., 8 and 9, Chiswell Street, E.C.1. *l.*
- 1924 PRIEST, C. G., 67, Portland Road, Holland Park, W.11. *l.*
- 1904 PRISKE, R. A. R., F.R.E.S., 136, Coldershaw Road, W. Ealing, W. 5. *l, m.*
- 1922 RAIT-SMITH, W., F.Z.S., F.R.E.S., F.R.H.S., "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*
- 1925 RALFS, Miss E. M., F.R.E.S., 27, Shaftesbury Road, Ravenscourt Park, W.6.
- 1887 RICE, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W.4. *orn.*
- 1920 RICHARDSON, A. W., F.R.E.S., 28, Avenue Road, Southall, Middlesex. *l.*
- 1934 RIDEOUT, J. K., "Hodsoniter," Godalming, Surrey.
- 1908 RILEY, Capt. N. D., F.R.E.S., F.Z.S., 7, McKay Road, Wimbledon, S.W.20. *l.*
- 1910 ROBERTSON, G. S., M.D., "Struan," Storrington, near Pulborough, Sussex. *l.*
- 1911 ROBINSON, Lady MAUD, F.R.E.S., Kirklington Hall, Newark. *l, n.*
- 1920 ROTHSCHILD, THE RIGHT HON. LORD, D.S.C., F.R.S., F.L.S., F.Z.S., F.R.E.S., Tring, Herts. *l, orn. (Life Member.)*
- 1890 ROWNTREE, J. H., "Scalby Nabs," Scarborough, Yorks. *l.*
- 1932 RUDLAND, W. L., 211, Caversham Road, Reading.
- 1932 RUSSELL, A. G. B., M.V.O., F.R.E.S., Scarbank House, Swanage, Dorset. *l.*
- 1915 RUSSELL, S. G. Castle, Homestead, Crawley, Winchester, Hants. *l.*
- 1908 ST. AUBYN, Capt. J. A., F.R.E.S., 14, Purley Knoll, Purley.
- 1910 SCORER, A. G., "Hillcrest," Chilworth, Guildford. *l.*
- 1927 SCOTT, E., M.B., "Hayesbank," Ashford, Kent. *l.*
- 1923 SEVASTOPULO, D. G., F.R.E.S., (*Life Member*), c/o Ralli Bros. Ltd., Calcutta. *l.*
- 1933 SHARMAN, F. W., 183, Star Road, Peterborough. *l.*
- 1910 SHELTON, W. G., F.Z.S., F.R.E.S., "West Watch," Oxted, Surrey. *l.*
- 1898 SICH, ALF., F.R.E.S., Coburg Court Hotel, Bayswater Road, W.2. *l.*
- 1925 SIMMONS, A., 42, Loughboro Road, W. Bridgford, Nottingham. *l.*

YEAR OF
ELECTION.

- 1921 SMART, Major, H. D., R.A.M.C., M.D., D.S.C., F.R.E.S., 172, High Road, Salway Hill, Woodford Green. *l*.
- 1908 SPERRING, C. W., 8, Eastcombe Avenue, Charlton, S.E. 7. *l*.
- 1927 STANLEY-SMITH, F. S., F.R.E.S., *Council*, "Oaklands," Brampton, Huntingdon. *l*.
- 1928 STANLEY-SMITH, Mrs. Maud, *Council*, "Oaklands," Brampton, Huntingdon. *l*.
- 1934 STEPHENS, J. A., 44, Mount Road, Chatham.
- 1928 STOCKEN, H. E. W., Orchard Cottage, W. Byfleet, Surrey.
- 1924 STOREY, W. H., "Tendera," Stinchcombe Hill, Dursley, *Glos. ent*.
- 1931 STOVIN, G. H. T., M.R.C.S., L.R.C.P., 42, Chalkwell Avenue, Westcliff-on-Sea, Essex.
- 1929 STUBBS, G. C., 31, Egremont Street, Ely, Cambs.
- 1934 SUTTON, G. R., Kenilworth Gardens, Loughton, Essex.
- 1916 SYMS, E. E., F.R.E.S., *President*, *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *l*.
- 1922 TAMS, W. H. T., F.R.E.S., 5, Daisy Lane, Hurlingham, S.W. 6. *l*.
- 1894 TARBAT, Rev. J. E., M.A., 1, Romsey Road, Winchester. *l, ool*.
- 1913 TATCHELL, L., F.R.E.S., Swanage, Dorset. *l*.
- 1934 TAYLOR, J. O., Lyndhurst, Grosvenor Road, Orpington. *l*.
- 1925 TAYLOR, J. S., M.A., F.R.E.S., Prickly Pear Laboratory, Graaffe Reinett, C.P., Union of S.A. *l*.
- 1929 TETLEY, J., "White Cottage," Silverlea Gardens, Horley.
- 1931 THOMPSON, J. A., Tan-y-Bryn School, St. Margarets Drive, Llandudno, N. Wales. *l*.
- 1933 THORPE, R. A., "Homestead," Forest Hill Road, Honor Oak, S.E.23.
- 1926 TOMLINSON, Miss Florence B., "The Anchorage," 51, Lodge Road, West Croydon. *l*.
- 1935 TOMPKINS, L. H., "Clifton," 18, Forest Side, Worcester Park, Surrey.
- 1902 TONGE, A. E., F.R.E.S., *Hon. Treasurer*, "Aincroft," Grammar School Hill, Reigate. *l*.
- 1934 TUNSTALL, H. G., 11, St. James Avenue, Ewell, Surrey.
- 1887 TURNER, H. J., F.R.E.S., F.R.H.S., *Hon. Editor*, "Latemar," 25, West Drive, Cheam, Surrey. *l, c, b, e.l*.
- 1932 TURPIN, S. J., 1, Windcliffe Mansions, Letchmere Road, Willesden Green, N.W.2.

YEAR OF
ELECTION.

- 1889 WAINWRIGHT, C. J., F.R.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*
- 1929 WAINWRIGHT, J. Chas., 9, Priory Road. Hook Road, Surbiton, Surrey.
- 1911 WAKELY, L. D., 15 Berkeley Place, Wimbledon, S.W.19. *l.*
- 1930 WAKELY, S., 4, Auckland Road, Upper Norwood, S.E.19. *l.*
- 1880 WALKER, Comm. J. J., M.A., F.L.S., F.R.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c.*
- 1927 WALKER, W. H., "Ranworth," Potters Bar. *l.*
- 1933 WALTER, F. G., 131, Prince's Avenue, Palmer's Green, N.13.
- 1920 WATSON, D., "Proctors," Southfleet, Kent. *l.*
- 1928 WATTS, W. J., 42, Bramerton Road, Beckenham. *c.*
- 1928 WELLS, Clifford, "Dial House," Crowthorne, Berks. *l.*
- 1911 WELLS, H. O., York Gate, Cheam Road, Ewell. *l.*
- 1911 WHEELER, The Rev. G., M.A., F.Z.S., F.R.E.S., "Ellesmere," Gratwicke Road, Worthing. *l.*
- 1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.
- 1934 WHITEHOUSE, Prof. H. Beckwith, M.B., M.S.LOND., 62, Hagley Road, Birmingham.
- 1914 WILLIAMS, B. S., "St. Genny's," 15, Kingcroft Road, Harpenden. *l, c, hem.*
- 1925 WILLIAMS, H. B., LL.D., F.R.E.S., "Red Mayes," 79, Broad Lane, Hampton-on-Thames, Middlesex. *l.*
- 1932 WILLIAMS, S. W. C., 17, Beresford Road, Chingford, E.4.
- 1932 WINDHAM, W. S., 40, Wellesley Road., Chiswick, W.4.
- 1927 WITTING, A. N., 6, Woolstone Road, Catford, S.E. 6.
- 1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*
- 1921 WOOD, H. W., F.R.E.S., 37, De Freville Avenue, Cambridge. *l.*
- 1926 WOOTTON, W. J., F.R.H.S., Wannock Gardens, Polegate, Sussex. *l.*
- 1927 DE WORMS, C. G. M., M.A., PH.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C., Milton Pk., Egham, Surrey. *l, orn.*
- 1935 CRASKE, E. S., "Hillsborough," Gringer Hill, Maidenhead, Berks.
- 1935 GOODLIFFE, F. D., Agricultural College, Long Sutton, Basingstoke. *ec.ent.*
- 1935 MULLER, Miss I. M., Mugswell, Chipstead, Surrey.
- 1935 OWEN, A. H., 41, Coombe Road, Croydon.
- 1934 OLIVER, G. B., "Hazlemere," High Wycombe, Berks. *l.*

Members will greatly oblige by informing the Hon. Sec. of any errors in, additions to, or alterations required in the above Addresses and descriptions.

REPORT OF THE COUNCIL FOR 1934.



The occurrence of two consecutive years of exceptionally fine summers has given naturalists an almost unprecedented opportunity for work and has provided an extraordinary amount of material for their attention, for in view of this weather combination many unusual happenings have taken place in the natural history world during 1934.

The Society can look back on an excellent year and can congratulate itself on much constructive work during that period.

There have been the customary twenty-two meetings and the Annual Exhibition at the Society's rooms. Ten papers and discussions have been introduced, by Messrs M. Niblett, C. G. M. de Worms, Dr. E. A. Cockayne, H. J. Turner, J. A. Downes, S. N. A. Jacobs, S. Wakely, Dr. K. G. Blair, R. Adkin, and E. E. Syms, and the average attendance at meetings was 41.5.

The Annual Exhibition took place on the 25th October, and the variety of the exhibits was greatly to be commended. Almost all insect orders were represented; there was the section for living objects, which as usual was a centre of interest, and in the section devoted to drawings there were some excellent specimens, covering a variety of subjects including birds, insects, fishes, seaweeds, sea anemones and fungi.

An innovation was the altered arrangement of the tables, which allowed visitors to circulate more freely around the exhibits, and added greatly to their enjoyment of the exhibition.

The number attending was recorded as 240.

Mr. Goodman is to be thanked for his attention to the catering arrangements and Mr. Grosvenor for having organised the exhibition, the proper carrying out of both of which functions contributed in no small measure to the success of the evening.

There were ten field meetings held, at Effingham, Chilworth, Westerham, Bookham, Broadwater Forest, Chalfont, Forest Row, Benfleet, Eynsford and Box Hill, led by Messrs T. R. Eagles,

C. G. M. de Worms, H. W. Andrews, C. N. Hawkins, Dr. G. V. Bull, Dr. K. G. Blair, Messrs R. W. Attwood, S. Jacobs and J. A. Downes. All these meetings were productive of interesting material, some exceedingly unusual species being found, some rare and others local, and the most gratifying feature of the year's field work was the increase in the number of members attending these meetings. Interim reports were read by the respective leaders, at the meetings allotted for that purpose, the full reports being published in the present volume.

There are now 245 members, consisting of 195 full members, 41 country members, 5 life members, and 4 honorary members; there have been fifteen elections, four resignations, two deaths, and twenty names removed from the list of members.

The Treasurer, whose improved health has been noted with pleasure by all members, has produced, as expected, his usual cheering balance sheet duly audited by Messrs Denvil and Howarth. The satisfactory state of this document is now looked on as a matter of course, but none the less, the Treasurer's part in having achieved this end is well in the mind of members, but his labours would be lessened if all members would remember that their subscriptions are due at the beginning of the year, thus saving him the necessity for sending out reminders to delinquents.

Exhibits have been excellent in quality and indicative of much care on the part of exhibitors, whose remarks have been interesting, and occasionally of considerable scientific value, but it is much to be regretted that in spite of the fact that the Editor of Proceedings has repeatedly asked for full written notes, many of these observations are lost through the omission on the part of exhibitors to comply with this simple request. Although a few are saved by the memory of the Editor, it is not physically possible that he should be able to remember all the remarks communicated without the assistance of the exhibitor's written notes.

Mr. Robert Adkin represented the Society at the Annual Congress of the South-Eastern Union of Scientific Societies, and he is greatly to be thanked for his report which is given in full in the present volume.

The Annual Volume of Proceedings and Transactions was published in July, and consists of 148 + xx pp. with eight half-tone plates, and contains the many useful and interesting papers, as well as the full reports of field meetings, which were presented before

the Society during the season. It has received its share of attention in the reviews published by the various entomological magazines, and maintains the credit of the Society.

The thanks of the Society are due to those gentlemen whose generosity has enabled the Publications Committee to include so many plates illustrating the papers published.

The Librarian reports that during the year, the number of members borrowing books shows an increase; the number of volumes lent for home reading being 276. The library has also been extensively used for reference purposes on our meeting nights.

The Curator reports that the Collection of Coleoptera presented to the Society by Dr. Joy has now been received from the British Museum and can be consulted.

The following gentlemen have added specimens to the various collections during the year. The thanks of the Society is due to them.

Messrs R. Adkin, E. J. Bunnett, Dr. K. G. Blair, S. N. A. Jacobs, E. E. Symms, H. Moore, H. Donisthorpe, C. Jarvis, G. B. Oliver, and F. J. Coulson.

ADDITIONS TO THE LIBRARY.

Books.—Argentine *Hesperiidae* part III, K. J. Hayward (the author); Brit. Ants, Donisthorpe (purchase); Seitz. Supp. to Pal. Rhopal. and ditto to Bombyces (purchase); Text Book of Ent., Imms. (President); Supp. to Moths of Eastbourne, Adkin (the author); Brit. Tortrices, Wilkinson, author's copy (R. Adkin).

PROCEEDINGS, TRANSACTIONS, REPORTS, ETC.—S. E. Naturalist and Antiquary; Bull. and Ann. Soc. ent. de France; Ann. Report of the Smithsonian Institute; Bull. R. Scuola d'Agri. Portici (Italy); Rep. U. S. National Mus.; Jr. Commons and Footpaths Preserv. Soc.; London Nat.; Trans. and Proceed. of the S. of England Entomological Soc.; Proc. Croydon N. H. Soc.; Rep. Hastings and E. Sussex N. H. Soc.; Rep. of the Perthshire N. H. Soc.; Proc. Bournemouth N. Science Soc.; Trans. Wisconsin Acad. of Science; Rep. of the Field Museum of Chicago; Proc. Norfolk and Norwich Nat. Sci. Soc.; Proc. I. of Wight N. H. Soc.; Report Conference of Delegates of Corres. Societies to the British Association; Essex

Nat. ; Mem. Connect. Ac. Sci. ; Trans. Leicester Lit.-Phil. Soc. ;
 Rep. Eton Coll. N. H. Soc. ; Bull. Lloyd Lib. ; Jr. Shanghai Inst. ;
 Jr. Wimbledon N.H.S.

PERIODICALS, MAGAZINES, ETC.:—Ent. Mo. Mag. ; Ent. Record ;
 Ent. ; Can. Ent. ; Ent. News ; Nat. Hist. (N. York) ; Vasculum ;
 Revista Ent. Soc. Argentine ; Repertorium ; Rev. d'ent. (Russia).

SEPARATES:—From American Mus. ; Smithsonian Inst. ; Royal
 Irish Acad. ; Chasa Ins. (Japan) ; Dr. Strand (Riga) ; Argentine
 Ent. Soc. ; M. Niblett ; Guide to Coll. of Rocks (Brit. Mus.) ; Dr.
 Horn (Berlin) ; Cat. of American Birds.

HON. TREASURER'S REPORT, 1934

The accounts for 1934 again show a healthy state of affairs as we just about covered our regular expenses out of income, apart from expenditure on special items which are non-recurrent.

These special items are :—

	£	s.	d.
Moving the Joy collection	15	0	
Bookcase	7	12	6
New books	15	9	6
	<hr/>		
Making a total of	23	17	0
	<hr/>		

Without these our expenses for the year amounted to £210 2 8, which is made up as follows :—

	£	s.	d.
Current expenses	86	13	5
Subscriptions	2	0	6
Proceedings	114	7	0
Bookbinding	2	19	6
Postages, etc.	4	2	3
	<hr/>		
	210	2	8
	<hr/>		

and our income to £212 18s. 8d. made up of

	£	s.	d.
Subscriptions	138	6	0
Dividends	27	2	9
Deposit interest	1	1	5
Donations	42	0	8
Sales	4	7	10
	<hr/>		
	212	18	8
	<hr/>		

The most notable feature of the accounts is the appreciation in the value of our investments.

It has always been the practice to value these at current market prices in making out the Balance Sheet, and on this basis they show

[Continued on p. xx.]

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LIBRARY FUND.

To Books purchased	15	9	6
" Book Case purchased	7	12	6
		<hr/>		
" Bookbinding	23	2	0
" Postages and Stationery ..	..	2	19	6
" Sub. to Ent. Mo. Mag. ..	..	4	2	3
" Balance carried down ..	..	15	0	
	..	1	16	4
		<hr/>		
		£32	15	1

SUSPENSE ACCOUNT.

To Balance carried forward..	£ s. d.			
..	..	17	10	3
By balance brought forward	£ s. d.			
„ Entrance fees	..	15	7	9
	..	2	2	6
				17 10 3
				£17 10 3

PUBLICATION FUND.

To Printing Proceedings	£ s. d.			
„ Reprints	..	87	18	5
„ Half-tone Blocks	..	4	1	5
..	..	22	7	2
„ Balance carried forward	..	114	7	0
	..	..	1	13 0
				£116 0 0
By Balance brought forward	£ s. d.			
„ Donations	..	..	4	1 0
„ Half-tone Blocks	..	..	22	7 2
„ Dividends on 3½% War Loan	26 8 2
„ Sales of Proceedings	10 10 0
„ Grant from General Fund..	2 9 10
	76 0 0
				£116 0 0

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BALANCE SHEET.

To Balance, being excess of assets over liabilities	£ s. d.			
	1031	14	1	
Liabilities.				
By Balances—				
Revenue a/c	..	..	42	12 11
Suspense a/c	..	..	17	10 3
Publication Fund	..	..	1	13 0
Library Fund	..	..	1	16 4
„ Investments at current quotations	..	..	..	63 12 6
£300 3½% War Loan at 109½	..	..	329	12 6
£391 3½% Con. Loan at 112½	..	..	440	7 3
£155 4% Consols at 118½	..	..	183	1 10
„ Subscriptions unpaid :—			953	1 7
Good	15	0	0	
Doubtful or bad	15	0	0	
worth say	15	0	0	
				£1031 14 1

Examined and found correct, this 19th January, 1935.

H. G. DENVIL
T. G. HOWARTH } Auditors.

ABSTRACT OF PROCEEDINGS.

8th FEBRUARY, 1934.

Mr. T. R. EAGLES, PRESIDENT, in the Chair.

The President exhibited larvae of the Beetle, *Pyrochroa serraticornis*, Scop., with an example of the imago.

Mr. Jacobs exhibited a specimen of the Carposinid moth, *Bondia fidelis*, Meyr., from Santa Fé, New Mexico, U.S.A., an exceedingly rare species of which Meyrick's type is reputed to be the only other example in this country. Also the small Noctuid moth *Menopsimus caducus*, Dyar, America's smallest species of this family, from Rochester, New York.

Mr. Robert Adkin exhibited a small branch of the Japanese Spindle Tree (*Euonymus japonicus*) bearing quantities of well developed fruits. He said that this species, as usually grown in our gardens, was kept so clipped that it had no chance of forming blossom, but even when allowed to run wild it was not often that flowers were produced and still less frequently were fruits formed. He thought it was probably owing to the prolonged fine, warm weather of last summer and autumn that many bushes at Eastbourne and some other places on the South Coast were this winter bearing quantities of well developed fruits.

Mr. Pinhey exhibited an example of the Noctuid *Polyphaenis xanthochloris*, Bdv., apparently an addition to the French fauna, as it is not included in the recent Catalogues of French Macrolepidoptera. The specimen was caught, with one other, at light, in Sept. 1933, in the Basses Pyrenées. The species is supposed to be confined to Sicily and some Spanish locality.

[NOTE.—The allied species *P. sericata*, Esp. is well known as occurring in the Basses Pyrenées. I believe the main difference between the two species lies in the ♂ antennae.—Hx.J.T.]

Mr. E. J. Bunnett exhibited a number of living beetles, *Scaphidium 4-maculatum*, Ol., from a colony in rotten wood, Farnborough, Kent.

Mr. Priske exhibited a series of coloured figures of named varieties of the Mollusc, *Helix aspersa*, Müll., painted by Mr. Stubbs of Brighton.

Mr. H. Moore, exhibited a beetle, *Strataegus titanus*, Fab., found among bananas from Jamaica.

Mr. Hugh Main gave an interesting demonstration with lantern slides showing the life-history of several species of Coleoptera that he had recently studied.

22nd FEBRUARY, 1934.

The PRESIDENT in the Chair.

Mr. J. O. Taylor of Orpington and Mr. J. L. Atkinson of Tankerton were elected members.

Mr. S. N. Jacobs exhibited a box of Micro-lepidoptera recently received from the United States of America.

Mr. R. C. R. Crewdson exhibited a series of *Taeniocampa gothica*, L., from Frant, Sussex, with f. *gothicina*, H.-S. from the Spey valley, Invernesshire; series of *Agrotis exclamationis*, L. from W. Kent, and Wicken; *Noctua primulae*, Esp. from Perthshire; *Apamea leucostigma*, Hb. and f. *fibrosa*, Hb. from Rannoch; *Boarmia repandata*, L. from Rannoch District and from Bettws-y-coed, Caernarvonshire; *Europhila (Anticlea) badiata*, Schiff. from Witherslack, Westmorland, and from Delamere, Cheshire. *Ectropis (Tephrosia) consonaria*, Hb. from Sevenoaks, Kent; *E. (Tephrosia) bistortata*, Gze., from the Gairloch district in Rossshire, from Struan, Perth, and from Witherslack, Westmorland; *Crocallis elinguaris*, L., from Penshurst, Kent, Formby (Lancs), Rannoch District, Perthshire, and from Kinlochewe, Rossshire; *Lampropteryx suffumata*, Schiff. from Lyndhurst, Hants, and from Rannoch District, Perthshire; *Lygris populata*, L. from Rannoch District, Perthshire; *Semiothisa liturata*, Clk., from Delamere, Cheshire.

Mr. Robert Adkin exhibited a specimen of the tropical American butterfly *Gynaecia dirce*, L., which had emerged in Eastbourne from a bunch of bananas. He said that the range of this species extended from Southern Brazil as far northward as Honduras, and he had little doubt that in this case, as was probable in other similar cases that had come under his notice, the caterpillar had crawled into the bunch of fruit at some period before shipment, pupated there, been thus conveyed to this country alive and, in spite of our inclement climate, had managed to emerge.

He also exhibited flower-heads of the alien plant *Tussilago fragrans*, a near relative of our native butterbur (*T. petasites*, L.) which had

established itself in many places in the south of England, as on the banks along the Parades at Eastbourne, whence these blossoms came. He said that the blossoms were more numerous and the heads finer this season than he had seen them for many years, and he attributed this to the unusually fine, warm summer of last year allowing the plant to fully mature and thus the flower shoots to form, and to the fine dry weather of the present month permitting them to expand to advantage.

Mr. M. Niblett exhibited a series of old galls from Bramble stems, caused by a Cynipid *Diastrophus rubi*, Bouché., the cells of which were occupied by a Halticine beetle, *Chaetocnema concinna*, Marsh. The beetles had apparently enlarged the openings of the cells to enable them to enter and hibernate in them.

He also showed Cynipid galls from oak, *Cynips tozae*, Bosc., from Spain and *Cynips glutinosa*, Gir. from the Riviera. Also a number of Aphid galls from China, imported for dyeing, and other Aphid galls from the East, from which about 100 Aphids had emerged.

Mr. C. N. Hawkins exhibited three specimens of *Erannis defoliaria*, Clerck. taken on Wimbledon Common in January, 1934, including two rather striking examples of the var. *obscura*, Stgr., with a dark costa to the forewing; and a very dark specimen of var. *obscurata*, Helfer. The last is by far the darkest specimen ever noted by the exhibitor from Wimbledon and appears to show, in the darkening of the ground colour of the hindwings and the general appearance of the specimen, some approach to a true melanic type, differing however from the Epping form, of which two melanic specimens taken at Chingford in December, 1933, were also shown for comparison; the one an extreme example and the other of the paler form. The Wimbledon specimen is actually intermediate between the two from Chingford in forewing colour but the hindwings are not so completely suffused with black, though the fringes are very dark, nor is the body appreciably blackened. The head and thorax are darker than in many melanic specimens from Epping.

Mr. S. Wakely showed a female specimen of *Chimabache phryganea*, Hb., which had emerged on the 10th of November. Although the males are often seen in numbers flying in the November sunshine, females are very seldom observed, no doubt owing to their retiring habits. Males of the same species were also shown; as well as both sexes of *Chimabache fagella*, Fb. for comparison.

Mr. T. R. Eagles exhibited living specimens of the "Death

Watch Beetle," *Xestobium rufovillosum*, Deg., part of a colony found in decayed willow near Rye House, Hoddesdon, Herts. Near the colony was found a specimen of its predator, *Opilo mollis*, L. A larva of the predator was also found. It is of a bright pink colour and is described and figured in "Trans. Ent. Soc." of 1834. He also showed larvae of the "Green Arches Moth," *Aplecta (Eurois) prasina*, Fb., reared from eggs. The young larvae from South Scotland were given him by Dr. G. V. Bull in the early summer of 1933. Also the beetles *Calandra granaria*, L., and *Ptinus tectus*, Bdv., and lepidopterous larvae (? *Ephestia kuehniella*, Zell.) found in a sample of oatmeal intended for domestic use.

Dr. Bull exhibited the galls on the oak, of the Cynipid *Aphilotrix (Andricus) fecundatrix*, Hart., of which the alternate generation, known as *Andricus pilosus*, Adlr., emerges from the small hairy galls on the catkins.

Remarks on the season showed that both insects and flowers even in Cornwall were very backward. *Gonepteryx rhamni*, L., was reported from Eastbourne.

8th MARCH, 1934.

The President, Mr. T. R. EAGLES, in the Chair.

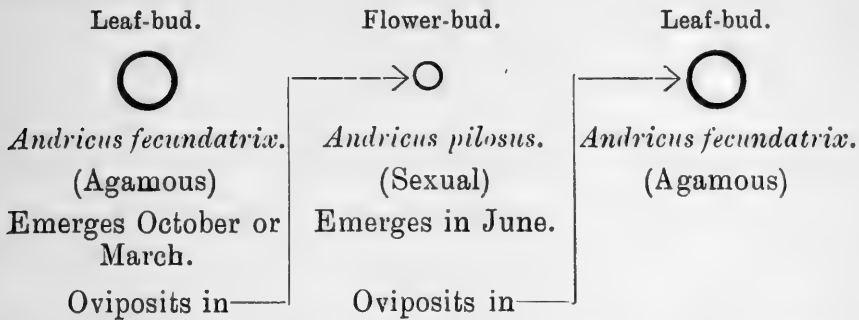
Mr. E. G. C. Pinhey of Earls Court Square, was elected a member.

Mr. T. R. Eagles exhibited the red (ab. *rufescens*, Tutt) form and the dark form of *Anarta myrtilli*, L.; a local Coleopteron, *Pediacus dermestoides*, Fb., from Epping Forest; and the Swan Mussel, *Anodonta cygnea*, L., from the New River, Enfield.

Mr. R. C. R. Crewdson exhibited series of the following Lepidoptera:—*Aplecta tineta*, Brhm., from the Rannoch district of Perthshire; *Pachetra leucophaea*, View., from mid-Kent; *Noctua ditrapezium*, Brk., from Langdale, Westmorland; *Leucania obsoleta*, Hb., from the Ely district of Cambridgeshire; *Xanthorhoë munitata*, Hb., from Langdale, Westmorland, plentiful on rocks; *Selidosema plumaria*, Schiff., (*ericetaria*, Vill.), from Witherslack, Westmorland; and *Psodos coracina*, Esp., from the Rannoch District of Perthshire.

Mr. M. Niblett exhibited one of the *Trypetidae*, *Trypeta (Orellia) winthemi*, Mg., not previously recorded from Britain; bred from flower-heads of *Carduus crispus*, L. (Wetted Thistle). (See "Ent. Record," 1934, p. 33.)

He also showed the *Cynipidae*, *Andricus fecundatrix*, Htg., with its galls, and *A. pilosus*, Adler, as an example of Alternating Generation, of which the cycle is the following:—



Mr. Niblett then exhibited the following galls to illustrate his paper on the "Gall Mites." (See Trans.)

Galls of:—*Eriophyes macrorhynchus*, Nal., *E. macrochelus*, Nal., *E. macrochelus*, Nal., var. *erinea*, Trot., **E. convolvens*, Nal., *E. triradiatus*, Nal., *E. origani*, Nal., *E. viburni*, Nal., **E. vitalbae*, Can., *E. tiliae*, Pagn., *E. tiliae*, Pagn., var. *liosoma*, Nal., *E. tiliarius*, Can., *E. galii*, Karp., **E. xylostei*, Can., *E. ribis*, Nal., *E. rudis*, Can., *E. avellanae*, Nal., *E. psilaspis*, Nal., **E. schmardae*, Nal., *E. ulmi*, Nal., *E. goniothorax*, Nal., *E. laevis*, Nal., **E. hippo-castanae*, Fock., *E. pyri*, Pagn., *Epitrimerus trilobius*, Nal.

Dr. K. G. Blair exhibited the British species of *Ectobius* (Cockroaches) to illustrate particularly the difference between *E. lapponica*, L. ♀ and *E. livida*, F., which are frequently confused.

The two may be separated by the following characters:—*E. lapponica*, ♀. Elytra not quite covering the abdomen, lower wings small, much reduced, dark in colour. Upper surface with very few and small dark spots, *i.e.*, about 2 on each oblique subcostal nervule, each with a fine hair. Underside with a broad dark streak down each side, last segment largely dark.

E. livida, ♂ ♀. Elytra rather more than covering the abdomen; lower wings but little reduced in ♀, fulvous. Upper surface with granulate dark dots more numerous, *i.e.* about four on each oblique subcostal nervule, each with a strong erect hair. Underside, including last segment, almost entirely pale.

Also a living Tortoise Beetle from west Africa. The beetle, *Aspidomorpha cincta*, F., was captured near Minna, Nigeria, in November last by Mr. G. Wilson and taken to Dr. Guy Morison of the Marischal College, Aberdeen. It was given leaves of

* Uncommon.

privet, dock and dandelion but did not appear to have fed. The convex portion of the elytra is a bright metallic golden colour and the expanded margins, except for the metallic ridges, clear. The colour appears to remain constant whether the insect is active or sluggish, there being no hint of the remarkable change of colour to be seen in the North American *Metrona bicolor*, F., (see "Proc. S. London Ent. Soc." 1928-29, p. 74.)

Mr. G. A. Brett exhibited living *Hemerophila abruptaria*, Thnbg. ab. *fuscata*, Tutt, bred from larvae which were shown at the last Annual Exhibition in October.

Mr. Hawkins exhibited the presumed hybrid between *Erannis aurantiaria*, Esp. and *E. defoliaria*, Clerck., which he had shown and described at the meeting of the Royal Ent. Soc. of London the previous night. The specimen, a ♀, was bred in December 1912 from a larva found on Wimbledon Common. It has the pattern of a *defoliaria* ♀, the golden colour of a ♂ *aurantiaria*, the maxillae of *aurantiaria*, (which are very different from those of *defoliaria*), and wings 2mm. long whereas in *defoliaria* ♀♀, the wings are vestigial and in *aurantiaria* they are 3mm. long.

Mr. M. Niblett then read a Paper "Mite Galls." (See Trans.)

22nd MARCH, 1934.

The PRESIDENT in the Chair.

Mr. R. A. R. Priske exhibited the ootheca of the small cockroach *Ectobius lapponica*, laid in captivity by a female taken at Ascot. The eggs were laid in double rows in the case.

Mr. S. N. A. Jacobs exhibited a living male of *Aphomia gularis*, Zell., the first bred out this year. The pupa was kept warm, in captivity.

Mr. T. R. Eagles exhibited the plant *Lithospermum*, Gromwell, from Studland, Dorset, and called attention to the seeds which had been hollowed out, presumably by an insect. He also showed some reed stems which had been eaten out by an unknown larva.

Mr. O'Farrell exhibited a rather well-marked specimen of *Spilosoma menthastri*, Esp. taken at St. Ives, Cornwall, by Mr. Thornley two years ago. He had a good number of specimens of the species from Cornwall, and the best marked of these, were included in the exhibit, together with an ordinary form for comparison.

Mr. de Worms exhibited larvae of *Aporophyla nigra*, Haw., a green

form. He reported that *Apocheima hispidaria*, Schiff. had been coming freely to light, that *Phigalia pedaria*, Fb., had been over for a fortnight, that *Erannis leucophaea*, Schiff. was also over and that the sallows were not yet out.

Mr. J. J. Coulson exhibited the following Coleoptera:—(1) *Oryzaephilus surinamensis*, L., var. *mercator*, Fauv. a series bred from almonds, Merton Park, 24th January. (2) *Silvanus unidentatus*, Ol., series taken under the bark of an oak branch broken by the wind, Esher Common, 27th February, 1934. (3) *Micromalus flavicornis*, Herbst., (taken alive) and *Eccoptogaster intricatus*, Ratz. (dead specimens) under the bark of the same branch on the same date. (4) A series of the bug, *Pezostethus cursitans*, Fall., same habitat, date and place.

7th APRIL, 1934.

FIELD MEETING—EFFINGHAM.

Leader.—Mr. T. R. EAGLES.

The weather forecast for the day spoke of rain, sleet and snow for London and South Eastern England. Nevertheless 17 members and 2 visitors braved the elements. Fortunately the weather prophets were entirely wrong. The afternoon was fair and warm with periods of sunshine.

By beating and sweeping among the pine and heather at Ockham the following Lepidoptera were obtained:—Imagines of *Sarrothripus revayana*, Tr.; *Pachynema hippocastanaria*, Hb.; and *Xylocampa areola*, Esp. Larvae of *Laspeyria (Aventia) flexula*, Schiff.; *Thera obeliscata*, Hb.; *Diacrisia sanio*, L.; *Agrotis agathina*, Dup.; *Hipparchus papilionaria*, L.: *Ellopiopsis fasciaria*, L. (*prosapiaria*, L.); *Perconia strigillaria*, Hb.; *Eupithecia tenuiata*, Hb.; and a cocoon of *Phragmatobia fuliginosa*, L.

One member found a batch of eggs of *Panolis griseo-variegata*, Goetz. (*piniperda*, Panz.) in his beating tray.

A dead pine trunk was found to contain numerous imagines of the "ruby-tail wasp," (*Chrysis ignita*, L.)

Among the Coleoptera from the pines were some interesting forms of *Mysia oblongoguttata*, L., and an abundance of *Myrrha 18-guttata*, L., and *Anatis ocellata*, L. Many specimens of the Hemipteron *Gastrodes ferrugineus*, L. were beaten.

The sallows yielded the beetle *Dorytomus tortrix*, L. in numbers, also *Exochomus 4-pustulatus*, L.; the Heteroptera *Anthocoris nemoralis*, F. and *A. nemorum*, L.; and the Ichneumonid *Hemiteles areator*, Pz.

In the evening *Panolis griseo-variegata*, Goez., and *Taeniocampa gracilis*, Fab., were taken along with the more usual species, but not many insects were on the wing.

12th APRIL, 1934.

The PRESIDENT in the Chair.

The President exhibited a larva of *L. (A.) flexula*, Schiff., and one of *Campaea (Metrocampa) margaritata*, L., beaten off the same sloe bush, and remarked on the superficial resemblance of the two larvae, no doubt due to wintering in similar quarters. Bedford, Herts.

Mr. O'Farrell exhibited the Nymphs of several species of Dragon-fly and read the following note:—"I am exhibiting a full-grown nymph of *Anax imperator*, Leach, taken among reeds in a small pond in Richmond Park on 26th March, also male and female nymphs of *Brachytron pratensis*, Müll., from the canal at Byfleet, to show the remarkable difference in colour between the nymphs of the two sexes. There is also a nearly full-grown nymph of *Enallagma cyathigerum*, Charp., which is of a very vivid green.

"I have also brought an example of the water-bug *Ranatra linearis*, L., which when at rest assumes an attitude rather like that of the 'Praying Mantis,' *Empusa egea*, Charp."

Dr. E. A. Cockayne exhibited *Selenia bilunaria*, Esp., E. Aberdeenshire, bred February and March, 1934, *Eupithecia helveticaria*, Bdv., Ballater, bred March, 1934, with specimens of *Phryxæ vulgaris*, Fall., bred from both species. The larvae of the flies left the pupae of their hosts early in the year and emerged in April. The interest of the exhibit lies in the small size of the *Phryxæ* from the *Eupithecia*, which Mr. C. J. Wainwright, who kindly identified them, says are the smallest he has ever seen. He thinks the species is continuous brooded and parasitizes almost any Lepidopterous larva, but according to Baer it is double brooded and may pass the winter either as a larva or a pupa.

He also exhibited a series of *Euphyia corylata*, Thnbg., bred, E. Aberdeenshire, and pointed out amongst the seventeen specimens one ab. *albocrenata*, Curt., and one asymmetrical with a plain stripe along the right costa.

Mr. M. Niblett exhibited the Cynipid species *Cynips tozae*, Bosc., which emerged 31.iii.34, from galls on the Spanish oak, *Quercus toza*, Bosc. obtained from Spain in 1933.

Mr. J. A. Downes exhibited larvae of 2 species of Caddis-fly (unidentified) from a stream near the source of the River Teign on Dartmoor, and a specimen of the boring mollusc *Pholadidea*, with the worm *Thalassema*, which often shelters in the old burrows of the mollusc.

Mr. S. Wakely exhibited nests of the Brown-tail moth, *Nygmia phaeorrhoea*, Haw. which were somewhat abundant in the stunted sloe bushes of the Essex Marshes.

Mr. Robert Adkin exhibited a specimen of an *Agrotis* ♀ that he received from the collection of the late Gervase Mathews labelled "Agrotis sp (?) a peculiar specimen from North Devon. Instow 1888." The forewings are of a uniform pale gray-brown colour, the three stigmata being distinctly outlined in darker brown as are also the transverse lines. It appeared to have affinities with both *A. segetum*, Schiff. and *A. corticea*, Hüb. but was thought to be probably an aberrant form of the former species.

He also exhibited a floral design, in the form of a question mark, composed of leaves, seed-vessels, bracts, sepals and other parts of plants, together with a key to their names. He said this was made by the mistress of a girls school in a country town with a view to assist in teaching botany to the pupils, and he understood that it had answered its purpose admirably.

Mr. de Worms gave an account of his Easter trip to Rannoch, where he had obtained the species usually obtained there at that time. The sallows were not fully out and the weather cold with snow showers at times.

26th APRIL, 1934.

The PRESIDENT in the Chair.

Dr. K. G. Blair exhibited larvae of *Procris (Adscita) statice*, L., reared from the egg, and also of *Lithosia complana*, L. from S. Devon.

Dr. King exhibited the larval mines of *Synanthedon andrenaeformis*, Lasp., and the larvae of *Agrotis ashworthii*, Dbldy., from N. Wales.

Dr. Bull reported *Agrotis saucia*, Hb., on 11th April.

The President exhibited ova of *Bupalus piniaria*, Panz.

Mr. de Worms exhibited larvae of *Cleora jubata*, Thnbg. (*glabraria*, Hb.) from the New Forest beaten from the lichen, "old man's beard" (*Usnea barbata*, Ach.).

Mr. Turner exhibited a series of *Diacrisia* (*Spilosoma*) *lutea*, L. (*lubricipeda*, Esp.) with some of the forms bred a generation ago including the extremely black marked *zatima*, Cr. (*radiata*, St.)

Dr. Robertson exhibited *Pararge aegeria*, L. from Sark, about 75% being the continental type form; a large banded form of *Boarmia punctinalis*, Scop. (*consortaria*, Hb.) from Sark; *Mamestra* (*Hadena*) *pisi*, L., varied forms from Oban; a very pale *Apamea gemina*, Hb. f. *remissa*, Tr. a species fairly common at sugar at Storrington, Sussex; *Zygaena trifolii*, L. from Sark; a *Xylophasia hepatica*, L. unusually dark ground with pale reniform stigmata from Storrington; *Aphomia sociella*, L. from Berks; etc.

The remainder of the evening was devoted to a discussion on the genus *Taeniocampa*, which was introduced by Mr. de Worms. Exhibitions of the various species were made by, or the discussion taken part in by, Dr. Cockayne, Dr. Bull, Dr. Robertson, Dr. Williams, Dr. Blair, the President, Messrs. Stanley-Smith, R. Adkin, J. A. Downes, L. H. Ennis, B. J. McNulty, A. O'Farrell, etc.

10th MAY, 1934.

The PRESIDENT in the Chair.

Mr. Ennis exhibited (i.) A fresh ♀ *Heliothis peltigera*, Schiff. taken on Wimbledon Common in April; (ii.) Two of four specimens of *Taeniocampa opima*, Hb., taken at Wimbledon during April; all on the same night. This makes a total of six specimens from Wimbledon—one in 1931; one in 1933, and four in 1934.

Mr. Eagles exhibited a full fed larva of the "Lappet" Moth, *Eutricha* (*Gastropacha*) *quercifolia*, Linn. beaten when quite small at the Eynsford Field Meeting in 1933, and read the following note from Dr. Hale Carpenter's book, "A Naturalist on Lake Victoria," pages 206 and 207.

. . . . "quite a number of procryptic insects are furnished with an aposeme which they display if an inquiring enemy comes unpleasantly near. The caterpillars of *Lasiocampidae*, previously alluded to, show, if disturbed, a cleft across the second or third segments, or both, filled with brightly coloured fine sharp spines,

which very readily become detached and penetrate one's skin, and would prove very unpleasant in the mouth of an enemy tasting such a caterpillar for the first time. The colour of the spines varies in different species. It may be orange, or pink, or steely blue-black, but is always such as to make the spines very conspicuous. When the caterpillar is quietly at rest and concealed by its procrypsis, the cleft is closed, but if the caterpillar is disturbed or touched it makes the cleft gape widely open, so that the brightly coloured spines are fully displayed. This may be seen in England in the caterpillar of the "Lappet-moth."

Mr. Eagles also exhibited the Longicorn beetle, *Pogonochaerus hispidulus*, Pill. beaten from maple at Studland, Dorset.

Dr. Cockayne exhibited a series of preserved larvae of various Noctuid species.

Dr. K. G. Blair exhibited living specimens of the birch sawfly, *Cimbex (Trichiosoma) sylvaticum*, Leach., and its cocoon.

Mr. M. Niblett exhibited the Cynipid, *Diastrophus rubi*, Bouché, which emerged 3.v.34 from galls on Bramble (*Rubus* sp.) stem.

Dr. Blair recalled Mr. Niblett's exhibit of 22nd February last, in which the empty galls of this species were enlarged and used as hibernacula by the flea-beetle, *Chaetocnema concinna*, Marsh.

Dr. G. V. Bull exhibited two *Lasiocampa (Bombyx) quercus*, L., which had been forced and had emerged within 8 months from the egg stage. Ova 30.vii.33: Pupa xii.33: Imago 19 & 30.iii.34.

Mr. Stanley Smith exhibited the larvae of *Strymon (Thecla) pruni*, Linn. from Monk's Wood and spoke of the general scarcity of larvae on the blackthorn this year.

Mr. Hy. J. Turner exhibited series of the insect from St. Anne's-on-Sea so long called *Apamea (Luperina) guenéei*, Dbldy., and which he showed conclusively was so named in error and should be called *Apamea nickerlii*, Freyer, ssp. *incerta*, Tutt. Included in the exhibit was series of *A. testacea*, Hb. from the British Isles including extreme forms kindly lent by A. J. Wightman, also *testacea* from various continental localities, the var. A of Guenée's "Noctuelles" from the late M. Oberthür. Also a series of the recently determined species *A. sohn-retheli*, Drdt. from the Abruzzi, Italy. Also a series of the *A. nickerlii*, Frr. from continental localities with an example from Nickerl's own collection; a couple of recent *A. nickerlii* from Tschechoslovakia, a couple of var. *tardiosa*, Four. from the neighbourhood of Paris; and series of *Apamea graslini*, Obthr. and *A. dumerilii*, Dup. which have been confused with forms of *nickerlii*.

12th MAY, 1934.

FIELD MEETING—ST. MARTHA'S, CHILWORTH.

Leader.—C. G. M. DE WORMS, F.R.E.S.

As in 1933, this field meeting was once more favoured with exceptionally fine weather and ideal conditions for collecting. A large party of nineteen members and friends assembled at Chilworth Station at midday. The route followed was along the path running parallel to the Downs and then up the slopes into the woods below the Chapel. Though this meeting was two weeks earlier than in the previous year, owing to the earliness of the season, there were a great many interesting species of all Orders of insects on the wing. Larvae were also equally numerous and once again those of *Strymon* (*Thecla*) *w-album*, Knoch., were beaten in large numbers from the wych-elms. Larvae of *Brachionycha cassinea*, Hb. (*sphinx*, Hufn.), however were not as plentiful as usual. Many species of butterflies were also much in evidence: these included *Polygonia c-album*, L., *Pieris brassicae*, L., *P. napi*, L., *P. rapae*, L., *Euchloë cardamines*, L., and *Lycaenopsis* (*Cyaniris*) *argiolus*, L. After tea at the Railway Hotel several members of the party repaired to the spruce wood near the mill, where a number of *Eupithecia tantillaria*, Bdv. (*pusillata*, Hb.) and *Thera variata*, Schiff., were dislodged from over-hanging branches. A few of the party remained on until dusk when *Perizoma affinitata*, Steph. and *P. flavofasciata*, Thnbg., were flying in great plenty over the red campion. After dark the leader illuminated a portion of the wooded slopes with his 300 candle-power lamp and moths began to come freely to the light, including several of the "Hook-tips." Unfortunately the party had to leave for London before the best flight took place, as the night which was very sultry turned out to be one of the best for that time of the season.

In addition to those already mentioned, the following is a list of some of the insects seen and taken during the Field Meeting.

LEPIDOPTERA:—Butterflies, *Aglais* (*Vanessa*) *urticae*, L., *Pararge aegeria*, L., *Gonepteryx rhamni*, L., etc.

Moths, *Cosymbia* (*Ephyra*) *punctaria*, L., *C. (E.) pendularia*, Clrk., *Ectropis punctulata*, Schiff., *E. crepuscularia*, Hb., *Thera obeliscata*, Hb., *Bapta temerata*, Schiff., *B. bimaculata*, Fb., *Gonodontis bidentata*, Clrk., *Udaria suffumata*, Schiff., *Asthena albulata*, Hufn. (*candidata*, Schiff.), *Ematurga atomaria*, L., *Heliaca tenebrata*, Scop., *Drepana falcataria*, L., *D. lacertinaria*, L., etc.

Larvae, *Taeniocampa incerta*, Hufn., *T. munda*, Esp., *Amphipyra pyramidea*, L., *Calymnia affinis*, L., *C. diffinis*, L., *Lygris pyraliata*, Schiff., *Malenydris didymata*, L., *Ennomos elingvaria*, L., *Himera pennaria*, L., *Phigalia pedaria*, Fb., *Pericallia syringaria*, *Plusia chrysitis*, L., *P. triplasia*, L., etc.

Mr. F. J. Coulson, taking a different route, reported as follows :—
“I arrived shortly before the main party and by general sweeping found *Apion violaceum*, Kby., common on nettles and *Olibrus corticis*, Pz. frequent on *Umbelliferae*.

“On the arrival of the party Mr. Grant and I proceeded to the heath south of the station (Blackheath) in search of beetles and bugs and found *Micrelus ericae*, Gyll., abundant together with *Ulopa reticulata*, F., and *Ischnorhynchus geminatus*, Fieb., both commonly. *Coccinella 7-punctata*, L., was flying over the open heath about noon and *Ematurga atomaria* was disturbed fairly frequently. The bug *Piezodorus lituratus*, F., occurred on the heath and furze and Mr. Grant was successful in finding *Cicindela sylvatica*, L., at the edge of the firwood. Later in the afternoon that species was flying more over the open heath, together with *Cicindela campestris*, L., and the bug *Megaloceraea ruficornis*, Geoff. was common. On the firs and pines *Myrrha 18-guttata*, L., was the most noticeable and *Anatis ocellata*, L., was fairly common. The bug *Gastrodes ferrugineus*, L., and *Aphidecta oblitterata*, L., also occurred on the firs. On furze *Apion ulicis*, Fourc., was abundant in fresh condition.

“Proceeding by the path over the railway bridge to the high road near the Albury Mill Pond, along a mixed hedge including both holly and ivy, the Holly Blue was flying, together with *Pieris napi* and *Euchloë cardamines*. The bug *Sehirus bicolor*, L., occurred here with the beetle *Limonijs minutus*, L., on the grass beneath the hedge.

“On the sedge by the pond the bug *Caterestes pedicularius*, L., was abundant (females predominated), and in less numbers, *C. bipustulatus*, Payk. Two or three *Psammochus bipunctatus*, F., *Cymus glandicolor*, Hahn., and *C. melanocephalus*, F., were also taken on the sedge. *Hippuriphila modeeri*, L., occurred on Equisetum, *Hydrothassa marginella*, L., on Ranunculaceae, *Hygronoma dimidiata*, Gr., and *Donacia semicuprea*, Panz., on reeds. Generally by the water-side and in the vicinity of the pond, the following were more or less common, *Agriotes pallidulus*, Ill., *Chaetocnema concinna*, Marsh., *Brachypterus urticae*, F., *Anthobium torquatum*, Marsh., and *A.*

minutum, F., *Stenus pallitarsus*, Steph., and *S. cicindeloides*, Gr., *Tachinus rufipes*, Deg., *Byturus aestivus*, L. (common), and *B. tomentosus*, F. (scarce), *Derocrepis rufipes*, L., *Synharmonia conglobata*, L., *Anisosticta 19-punctata*, L., and *Thamnotettix croceus*, H.-S. (Hem.). As usual in Surrey *Hermaphysa mercurialis*, F., was abundant on Dog's Mercury. *Monanthia cardui*, L. (Hem.), occurred on thistles.

"Beneath the bark of a recumbent tree (probably oak) in the wood the following occurred: *Bythinus curtisi*, Leach, *Ptinella denticollis*, Fairm., *Cercyon flavipes*, F. (anal., Pk.), *Ditoma crenata*, F., *Dinaraea aequata*, Er., *Thectura cuspidata*, Er., and *Phloeonomus pusillus*, Gr.

"In a tree stump with fungoid growth near the Cypress section of the wood east of St. Martha's occurred *Mycetophagus 4-pustulatus*, L., *Cerylon histeroideus*, F., *Rhizophagus bipustulatus*, F., *Anisotoma humeralis*, F., and a species of *Scaphisoma*."

Mixed sweeping during the afternoon produced the bugs *Cixius pilosus*, Ol., *Calocoris ochromelas*, Gmel., and *Lygus limbatus*, Fall. A pair of the fine Syrphid *Criorrhina ranunculi*, L., drew attention by their high singing note to their presence in a dark cavity at the base of a tree. (K.G.B.)

Mr. H. W. Andrews reported on the Diptera as follows:—

"Some 40 species of Diptera were either taken, or observed, and this number would probably have been well exceeded if members other than the writer had turned their attention to this Order. Those species taken were mainly such as might be expected in similar conditions at this time of year, and perhaps the absence of representatives of certain groups was more noteworthy, than the presence of others. No *Leptidae* or *Tabanidae* (sens. lat.) were seen, very few *Empidae*, and only one species of *Dolichopodidae*. The absence of the last named group may perhaps be attributed to the very dry season. *Syrphidae* were abundant, and the commoner species of *Tachinidae* and *Anthomyiidae* also much in evidence: of the *Anthomyiids*, *Phaonia confluens*, Stein, and (?) *Helina deleta*, Stein, deserve special mention."

A list of the species observed:—*Bibio marci*, L.; *Microchrysa polita*, L.; *Gymnopternus cupreus*, Fall.; *Empis tessellata*, F.; *Pipunculus campestris*, Lat.; *Chilosia variabilis*, Pz.; *Platychirus scutatus*, Mg.; *Leucozona lucorum*, L. (a fine example of the "dark" form of the ♂); *Didea fasciata*, Meq.; *Syrphus albostriatus*, Fln.; *S. tricoloratus*, Fln.; *S. venustus*, Mg.; *S. bifasciatus*, F.; *S. cinctellus*, Ztt.; *Eristalis pertinax*, Scop.; *Myiatropa florea*, L.; *Criorrhina*

floccosa, Mg.; *Syrirta pipiens*, L.; *Stomoxys calcitrans*, L.; *Morellia hortorum*, Flin.; *Dasyphora cyanella*, Mg.; *Lucilia caesar*, L.; *Mesembrina meridiana*, L.; *Poliates lardaria*, F.; *Anthomyia pluvialis*, L.; *Hylemyia strigosa*, F.; *H. variata*, Fall.; *Helina pubiseta*, Ztt.; *H. deleta*, Stein (?); *Fannia hamata*, Mcq.; *Phaonia confluens*, Stein; *Ermistia rudis*, Fall.; *Exonita glauca*, Mg.; *Phryno vetula*, Mg.; *Phorocera assimilis*, Fall.; *Phorocera caesifrons*, Mcq.; *Sarcophaga vicina*, Vill.

24th MAY, 1934.

The PRESIDENT in the Chair.

Mr. C. H. Huggins of Westcliffe and Mr. J. C. B. Craske of Kensington were elected members.

Dr. Cockayne discussed the differences in the larvae of *Phigalia pedaria*, Fb. and *Apocheima* (*Nyssia*) *hispidaria*, Schiff. Colour was no guide but if held sideways it would be noticed that the latter had no prominences on the back. He called attention to a larva of *Taenio-campa incerta*, Hufn., on the back of which was a decided hump; and showed a larva of *Euphyia* (*Phibalapteryx*) *polygrammata*, Bork., of German origin. In referring to the larvae of *Zygæna purpuralis*, Brün., he stated that the continental larvae of this species had a purple-white skin.

Mr. Niblett exhibited carpels of *Populus tremula*, L., galled by a fungus, *Taphrinia johansonii*, Sadebech; and also the Cynipid, *Neuroterus aprilinus*, Gir., and galls in buds of *Quercus robur*, L.

Mr. L. H. Ennis exhibited (1) Ova of *Macrothylacia rubi*, L., laid by a wild ♀ taken at Wisley, 22.v.1934, and also some ova found wild; (2) Ova of *Lobophora halterata*, Hufn. laid by ♀ ♀ taken at Horsley, 21.v.1934, by day; (3) Larvae of *Phalaena* (*Pericallia*) *syringaria*, L., from Horsley; (4) Young larvae of *Saturnia pavonia*, L., second brood from Ascot, hatched 20-24.v.1934; and also reported that *Cerura bifida*, Hb., and *Palimpsestis octogesima*, Hb., had emerged from pupae taken wild from a poplar tree, *Populus niger*, about a month previously.

Mr. Wakely exhibited larvae of *Malacosoma castrensis*, L., from the River Crouch, Essex.

Mr. Coulson exhibited a large number of the insects he took at the Chilworth Field Meeting on 12th May.

Mr. Stanley Smith exhibited larvae of *Cirrhia* (*Xanthia*) *citrago*, L.

and of *Cirrhoedia xerampelina*, Hb. He also reported the early appearances of *Hamearis lucina*, L., on 13th May; of *Carterocephalus palaemon*, Pall., on 19th May; and of *Rumiccia phlaeas*, L., on 22nd May. He reported that the larvae of *C. citrigo*, L., were plentiful at night on the uppersides of the leaves but readily dropped off, and that those of *C. xerampelina*, Hb., came down by day on the trunk or hid among the clusters of "keys."

Dr. Bull exhibited *Dianthoecia carpophaga*, Brkn. (*lepida*, Esp.) of white or whitish-brown almost purplish colour; and reported that *Brenthis euphrosyne*, L., and *B. selene*, Schiff., had appeared a few days previously.

Mr. Robert Adkin exhibited a living specimen of the beetle *Melolontha melolontha*, L. (*vulgaris*, Fab.) taken at light in his garden at Eastbourne. He said that his reason for showing it was that, although he had been working the light trap for some three years, it was very rarely indeed that a beetle of any sort was found in it, whereas during the past fortnight it had captured some half dozen of these "common cockchafers."

It was stated by some of the coleopterists present that *Melolontha* had been abnormally abundant this spring both in Britain and on the continent of Europe, and it was suggested that this would probably account for the above mentioned captures.

Mr. Hawkins reported the Coleoptera, *Molorchus minor*, L., beaten from pine at Chilworth; *Tritoma bipustulata*, F., on the fungus *Polystictus versicolor*, at Ockham; and *Attagenus pellio*, L., from Wimbledon.

Mr. Crow exhibited the larva of *Limenitis camilla*, Schiff. (*sibilla*, L.) from N. Hants.

Mr. Hutchings exhibited the larva of *Apatura iris*, L., from the New Forest, and the British orchids, *Orchis purpurea*, Huds., *O. ustulata*, L., *Aceras anthropophora*, R.Br., *Ophrys muscifera*, Huds., and *Habenaria bifolia*, R.Br., and reported that he had found the larvae of *Nygmia phaeorrhoea*, Haw. (*chrysorrhoea*, L.) feeding on blackthorn, whitethorn, rose, bramble, elder, cranesbill, dock, mallow and thistle, but not on galium; and referred to the larvae of *Calocampa exoleta*, L., as feeding well on dock when young but later readily eating lime foliage.

Dr. Joy made some remarks on the collection of Coleoptera, containing about 3,300 species, he had so generously presented to the Society.

26th MAY, 1934.

FIELD MEETING—WESTERHAM.

Leader.—MR. S. N. A. JACOBS.

The afternoon party of four members left Westerham about two o'clock, and set off along the Kent Hatch Road, entering the woods on the right, and proceeded up the main drive, beating birch, oak and pine, and although insects were not over plentiful, no one went empty handed. Weather was bright sunshine with little wind, and all the commoner woodland insects of the neighbourhood were in evidence. It is to be regretted that the bracken is being allowed to grow at the expense of the bilberry, which is not nearly so plentiful in recent years as heretofore, and *Bomolocha fontis*, Thnbg., and *Cepphis advenaria*, Hb., are both apparently on the decrease. In the course of the afternoon, the morning party was joined, and all retired to Pitt's Cottage for tea, and so home.

9th JUNE, 1934.

FIELD MEETING—BOOKHAM COMMON.

Leader.—MR. C. N. HAWKINS, F.R.E.S.

The Society had not held a Field Meeting at Bookham since 17th May, 1930, and although no doubt some members had visited the locality individually in the meantime, it came as an unpleasant surprise to many to see the drastic cutting of the lower boughs of some of the large oaks which had been indulged in by those in charge of the woods.

The later date and the extreme dryness of the season resulted in a somewhat different fauna being noted; Lepidopterous larvae were comparatively scarce, but some interesting species were recorded and also some good imagines; Coleoptera and "Other Orders" were fairly abundant.

The meeting was favoured with good weather, and the dryness of the ground enabled parts of the common, which are usually very wet, to be worked with ease.

Arrangements were made for both morning and afternoon parties which joined forces on the arrival of the latter after lunch.

On leaving the station in the morning the route taken was across the marshy part of the common towards Effingham and then up

into the woods. Subsequent to meeting the afternoon party at the station, most of the members worked the area around the ponds. One of the first things noted was the "song" of the Grasshopper Warbler and immediately afterwards the bird was seen, still "singing" on the top of a Hawthorn bush. Although frequently heard in suitable places, the bird is rarely seen.

Tea was taken at Mrs. Holland's cottage on the Common, and afterwards some of the party continued collecting while others returned home.

Among the species of Lepidoptera noted in one stage or another were imagines of *Brenthis* (*Argynnis*) *euphrosyne*, L. (worn); *Euchloë cardamines*, L. (and larvae); *Gonepteryx rhamni*, L.; *Lobophora halterata*, Hufn. (and larvae); *Perizoma albulata*, Schiff.; *Ectropis crepuscularia*, Hb.; and *Harpalotis* (*Erastris*) *fasciana*, L.; *Timandra amata*, L., and larvae of *Aphantopus hyperantus*, L.; *Malacosoma neustria*, L., on several Laurel bushes (an unusual foodplant) at the Railway Station; *Nola cucullatella*, L.; *Sarrothripa revayana*, Tr.; *Polyplocia ridens*, Fb.; *Diloba caeruleocephala*, L.; *Monima* (*Taenio-campa*) *gracilis*, F.; *Dyschorista fissipuncta*, Hw.; *Plastenis* (*Tethea*) *retusa*, L.; *Cleoceris viminalis*, F.; *Apocheima hispidaria*, Schiff.; *Ectropis bistortata*, Goeze; *Rivula sericealis*, Sc., and *Cerostoma scabrella*, L.

The Dragonflies, *Calopteryx splendens*, Harr., and *Pyrhosoma nymphula*, Suls., were seen while *Agrion puella*, L., was reported to be present "in swarms."

Mr. M. Niblett reported the following Plant Galls observed:—

HYMENOPTERA.—*Cynipidae*.—*Biorrhiza pallida*, Oliv., *Trigonaspis megaptera*, Panz., *Andricus sieboldi*, Htg., *A. seminationis*, Adl., *A. curvator*, Htg., *A. inflator*, Htg., *Neuroterus albipes*, Sek., *N. tricolor*, Htg., all on *Quercus robur*, L.

Tenthredinidae.—*Pontania bridgmani*, Cam., on *Salix cinerea*, L.

DIPTERA.—*Trypetidae*.—*Urophora cardui*, L., on *Cnicus arvensis*, L.

Cecidomyiidae.—*Steomyia cupreae*, Win., *S. major*, Kieff., *Rhabdophaga salicis*, Sch., all on *Salix cinerea*, L.; *Macrodiplosis dryobia*, F. Loew., on *Quercus robur*, L.; *Perrisia rosarum*, Hardy, on *Rosa canina*, L.

COLEOPTERA.—*Saperda populnea*, L., on *Populus tremula*, L.

RHYNCHOTA.—*Psyllopsis fraxini*, L., on *Fraxinus excelsior*, L.

ACARINA.—*Eriophyes similis*, Nal., on *Prunus* sp.

Mr. Coulson reported the following:—(*=occurring commonly.)

COLEOPTERA.—General sweeping produced:—*Mordellistena pumila*,

Gyll., *Hippuriphila modeeri*,* L. (on Equisetum), *Dasytes aerosus*, Kies., *Malachius bipustulatus*, L., *Telmatophilus caricis*,* Ol. (on rushes), *Laria loti*,* Payk., *Longitarsus holsaticus*, L.

The following species usually common in this locality occurred only sparingly possibly owing to the dry conditions:—

Phaedon cochleariae, F., *Ceuthorhynchus melanarius*, Steph., and *C. melanostictus*, Marsh, *Hydrothassa aucta*, F., *Prasocuris phellandrii*, L., *Notaris acridulus*, L.

The dried up condition of the ponds rendered the “marestail” more accessible and many species normally obtainable in fewer numbers were taken freely. The following species were taken in the afternoon amongst the “marestail.”

Aleochara lata, Gr., *Gymnusa brevicollis*, Pk., *Philonthus fuscipennis*, Mann., *Trogophloeus corticinus*, Gr., *Bagous nigritarsis*,* Thoms., *Stenus fulvicornis*, Steph., *S. flavipes*, Steph., *S. fornicatus*, Steph., *S. juno*,* F., *S. pallitarsis*,* Steph., and *S. cicindeloides*,* Gr., *Tanyssphyrus lemnae*, F., *Erirhinus festucae*, Hbst., and *E. nereis*, Pk., *Bembidion doris*,* Pz., and *B. gracilis*, Gyll., *Agonum versutum*, Gyll., *Pterostichus vernalis*, Pz., *Dyschirius luedersi*, Wagn., *Acupalpus luteatus*,* Duft., *Caelostoma orbiculare*, F., *Ootypus globosus*, Watl., *Atomaria mesomelaena*,* Hbst., *Anisosticta 19-punctata*,* L., *Coccidula rufa*, Hbst., *Galerucella lineola*,* F., and *G. tenella*,* L., and *Stenolophus mixtus*,* Hbst.

On sallow occurred *Chalcoides aurata*,* Marsh, *Lochmaea capreae*, L., *Orchestes salicis*, L.

On hawthorn, *Lochmaea crataegi*, Fourc., *Rhynchites aequatus*, L.

On the rushes in late afternoon and evening, *Bryaxis longicornis*, Leach, was taken abundantly.

RYNCHOTA.—*Centrotus cornutus*,* L., *Deltocephalus pulicaris*,* Fall., *Oncopis flavicollis*,* L. (on birch), *Monanthia ampliata*,* H.S., and *M. humuli*,* F., *Steroma pteridis*,* Fall. (on fern), and a species of *Salda* on “marestail.”

14th JUNE, 1934.

The PRESIDENT in the Chair.

Dr. Bull exhibited an example of *Brenthis euphrosyne*, L., heavily blotched with black on all four wings, also a living larva of *Boarmia cinctaria*, Schiff.

Mr. Hugh Main gave an interesting account of a holiday he had recently spent in Portugal in search of natural history material, and

exhibited various living objects he had brought home. His exhibit included a small water tortoise, a field cricket, *Gryllus campestris*, L., which the natives often kept in small cages, they fed readily on lettuce; a very active small lizard which was captured by a noose of grass; beetles of the genus *Akis*; larvae of *Thais rumina*, L., which could be found early in the day on walls; the beetle *Blaps gages*, L.; the large and ferocious trap-door spider, *Nemasia fagei*, which made a thick plug trap-door; etc.

Dr. Joy gave an account of a visit to the reserved areas of the Norfolk Broads where the Bittern and the Harriers were now well established.

Dr. Bull stated that he had obtained a pairing of *Rumicia phlaeas*, L., by placing the insects under a meat safe covering plants of dock.

Among the seasonal reports were *Colias croceus*, Fourc., larval nests of *Nygmia phaeorrhoea*, Haw., quite abundant, and *Melitaea cinxia*, abundant in the Isle of Wight; *Nepticula decentella*, H.-S.; *Polygonia c-album*, L., at Bookham; *Polyommatus icarus*, Rott., already over in places; *P. thetis*, Berg., was out; *Lycaenopsis argiolus*, L., was abundant in places; *Eugonia polychloros*, L., had been seen and one had been taken near Eastbourne.

The President exhibited larvae of *Calocalpe cervinalis* (*certata*, Hb.), from Enfield, and the Coleoptera *Cassida viridis*, L., *Scolytus destructor*, Ol., and *Magdalis armigera*, Geoffr.

Mr. Robert Adkin exhibited several nests of living larvae of *Hyponometa malinellus*, Fell., to show their method of feeding. He pointed out that whereas *H. padellus*, L., fed in large companies making great masses of web, *H. malinellus* was invariably found in small companies and seldom webbed in more than one leaf at a time and when that was finished, moving on to another. He further said that *H. malinellus* was far too abundant in his garden at Eastbourne this spring. Of over fifty small apple trees there it was doubtful if one was entirely free, most of them having anything from two to half-a-dozen nests on each.

Dr. Cockayne exhibited a living larva of *Xantholeuca croceago*, Fb.; a noticeable aberration of *Taeniocampa populeti*, Fb., in which the marking was much accentuated; bred examples of *Eupithecia exiguata*, Hb. f. *unicolor*, Prout; *E. innotata*, Hufn.; a dark *E. helveticaria*, Bdv., with unusually accentuated lines; *E. plumbeolata*, Haw., and *E. pusillata*, Hb.; and preserved larvae of *Taeniocampa incerta*, Hufn., and *Calocampa exoleta*, L.

Mr. Wakely exhibited an oakleaf containing the mine of the Tineid *Corisium brogniardella*, D.L.

Mr. O'Farrell exhibited a ♀ *Phalaena syringaria* in its characteristic protective attitude.

17th JUNE, 1934.

FIELD MEETING.—BROADWATER FOREST.

Leader.—Dr. G. V. BULL.

The Field Meeting on 17th June at Broadwater Forest was, in the number of insects taken, the most successful yet held, and as the weather was also fine a most enjoyable day was spent by the nine members present. On the way from Groombridge station a number of *Odezia atrata*, L., were taken and two *Ino statices*, L. A return was made to the locality after lunch and one more of the latter species was secured. In the forest *Brenthis selene*, L. was flying in good condition, and other species noted were *Diacrisia sanio*, L. (three females being taken by one member), *Lithosia sororcula*, Hufn., *Cybosia mesomella*, L., *Erastria fasciana*, L. (plentiful), *Eulype hastata*, L., *Mesolenca albicillata*, L., *Hydriomena coerulata*, Fb. (*impluviata*, Hb.) The total number of species of macrolepidoptera was 42 and in addition eight species of larvae including *Drymonia chaonia*, Hb., and *Saturnia pavonia*, L. were found. The outstanding capture of the day, almost at the last minute was a specimen of *Cerura bicuspis*, Bork.

The remaining Macro species were *Pieris rapae*, L., *Gonepterya rhamni*, L., *Aglais urticae*, L., *Maniola jurtina*, L., *Coenonympha pamphilus*, L., *Rumicia* (*Heodes*) *phlaeas*, L., *Polyommatus icarus*, Rott., *Nisoniades tages*, L., *Argades sylvanus*, Esp., *Pygaera bucephala*, L., *Drepana falcata*, L., *Triphaena pronuba*, L., *Xylophasia monoglypha*, Hufn., *Iodis lactearia*, L., *Cosymbia* (*Ephyra*) *pendularia*, Clrek., *Cidaria corylata*, Thnbg., *Thera obeliscata*, Hb., *Xanthorhoe montanata*, Schiff., *Euphyia* (*Camptogramma*) *bilineata*, L., *Euchoeca nebulata*, Scop. (*obliterata*, Hufn.), *Cabera pusaria*, L., *C. exanthemata*, Scop., *Pseudopanthera* (*Venilia*) *macularia*, L., *Gonodontis bidentata*, Clrek., *Semiothisa notata*, L., *Boarmia punctinalis*, Scop. (*consortaria*, Hb.), *Ematurga atomaria*, L., *Bupalus piniaria*, L., *Lithina chlorosata*, Scop. (*petraria*, Hb.), *Perconia strigillaria*, Hb., and *Zygaena filipendulae*, L.

Dr. K. G. Blair reported on the following Orders:—

COLEOPTERA.—Of the beetles the most noteworthy was the Longicorn *Strangalia nigra*, L., swept with *Alosterna tabacicolor*, DeG., from the flowers of *Chrysanthemum leucanthemum*. Other species of interest were *Clytra 4-maculata*, L., a denizen in its early stages of the nests of the wood-ant, *Formica rufa*, L., *Cryptocephalus bipunctatus*, L., but only the common form *lineola*, F., *Melandrya caraboides*, L., *Elatér balteatus*, L., and *Dryophilus pusillus*, Gyll., beaten from pine.

DIPTERA.—The biting flies *Therioplectes tropicus*, Mg., *Haematopota pluvialis*, L. and *Chrysops coecutiens*, L. were well in evidence and of the predacious robber flies, *Asilidae*, *Dioctria oelandica*, L. and *D. rufipes*, Deg., as well as *Neotamias cyanurus*, L. were noticed. The fine Daddy-long-legs, *Tipula gigantea*, Schrk., was also not uncommon.

HYMENOPTERA.—The sawflies noted included the somewhat rare *Strombocerus delicatulus*, Fall., on bracken together with the common *Strongylogaster cingulatus*, F., while on the fir trees several families of the larvae of *Lophyrus sertifer*, Geoffr., were observed (from a number of the latter, 21 flies all ♀ emerged in September).

NEUROPTERA.—Included the beautiful spotted-winged Lacewing fly, *Osmylus chrysops*, L., and *Chrysopa ventralis*, Ct., while *C. perla*, L., was abundant.

ORTHOPTERA.—*Gomphocerus maculatus*, Thnb., was found mature, a somewhat early date for this species.

ODONATA.—*Calopteryx virgo*, L., was the only one noted.

HEMIPTERA.—Included the pretty little Tingid *Serenthia laeta*, Fall.

Mr. S. Wakely reported the following:—*Cacoecia rosana*, L., and *Argyroplote ochroleucana*, Hb. (larvae of both on dog-rose); and *Oedematophorus lithodactyla*, Tr., and *Tinea (Acrolepia) granitella*, L. (larvae of both on *Inula dysenterica*, L.).

28th JUNE, 1934.

The PRESIDENT in the Chair.

Mr. T. R. Eagles exhibited the ova of *Mysticoptera sexalata*, Retz., from Studland, Dorset; and larvae of *Ennomos quercinaria*, Hufn., from Epping, and remarked that their colour when beaten was green, but was now the usual brown colour.

Mr. Niblett exhibited a Trypetid species, *Gonioglossum wiedmanni*,

Mg., which emerged in May, 1934, bred from fruits of *Bryonia dioica*, L.; and a Braconid, *Opius testaceus*, Wesm., which emerged in June, 1934, from pupae of the same; together with *Trypeta winthemi*, Mg., bred from the flower-heads of *Carduus crispus*, L., on 27.vi.34.

Mr. Jacobs exhibited five specimens of *Nepticula decentella*, H.-S., from Bromley, Kent, and remarked that from the frequency with which he had observed this insect in the neighbourhood of sycamore trees, the insect has obviously been overlooked in this country. Mr. Adkin remarked that the species was probably widely distributed.

Mr. Coulson exhibited a large number of his captures of Coleoptera and Hemiptera at the Bookham Field Meeting on 9th June.

Mr. Stanley Smith exhibited full fed larvae of *Taeniocampa opima*, Hb.; as usual the mortality in the brood was large. Most of the larvae were of a brown coloration, only a few being green.

Mr. Bliss exhibited larvae of *Drymonia chaonia*, Hb., from Broadwater Forest.

Mr. Brett exhibited two bred examples of *Hemerophila abruptaria*, Thnbg. ♂, one typical and one melanic; and a larva of the same brood of 147 eggs. Also ova of another brood. The parents were typical ♂ and melanic ♀ and the ova hatched 17.iii.34.

Mr. Robert Adkin exhibited short series of *Lasiocampa quercus*, L., from Scotland, Yorkshire and the South of England. The Scotch specimens were of the *callunae*, Palm. form, and included a male without the pale bands on the hindwings. Those from Yorkshire included a male having the *callunae* characters—the pale basal patch and broad, curved band—well developed; a female of a dark brown colour almost as dark as the normal male; and what appeared to be a gynandromorph, in which the wings on the left side were distinctly male, while those on the right were larger and of the female pattern but almost as dark as the others. Among the South of England specimens was a male with very pale forewings; a dark female, and another of an almost unicolorous yellowish buff, the only distinct markings being the discal spots on the forewings.

Dr. Cockayne exhibited a varied series of larvae of *Eupithecia centaureata*, Schiff. (*oblongata*, Thnbg.) and a series of forms of *Abraxas grossulariata*, L., which he obtained previously to the forms bred by the late Rev. G. H. Raynor.

Dr. King exhibited larvae of *Selenia tetralunaria*, Hufn. from

Sussex, and also of *Agrophila trabealis*, Scop., from the Breck area of the Eastern Counties.

Dr. Bull exhibited *Lasiocampa quercus*, L., from Essex, Sussex and Kent with local forms from Cambridge, Yorkshire, Lancashire, Cumberland and Scotland.

Mr. Downes read a paper, "Racial Variation of *Lasiocampa quercus*."

30th JUNE, 1934.

FIELD MEETING—CHALFONT ROAD.

Leader.—T. R. EAGLES.

The insects especially to be looked for at Chalfont Road are the Lepidoptera *Discoloxia blomeri*, Curt., and *Abraxas sylvata*, Scop. Neither insect was found in numbers on the occasion of the 1934 visit, but nevertheless those members present who wanted these two species were able to secure a short series of each.

In addition there were taken in the wood, larvae of *Lycaenopsis argiolus*, L.; *Ennomos fuscantaria*, Steph.; and *E. quercinaria*, Hufn.; imagines of *Hydrelia flammeolaria*, Hufn. (*luteata*, Schiff.), and *Zanclognatha grisealis*, Hb.; the Weevil *Cionus pulchellus*, Hb., and many other beetles.

The rough fields between the Station and the wood yielded larvae of *Pyrameis (Vanessa) cardui*, L.; *Rumicia (Heodes) phlaeas*, L.; *Eupithecia venosata*, Fb.; *Dianthoea capsicola*, Hb.; *D. carpophaga*, Bkh.; and *D. conspersa*, Esp.; and imagines of the plume moth *Leioptilus septodactyla*, Tr. (*lienigianus*, Zell.). Numerous species of beetles were found in these fields, including *Malachius marginellus*, Ol.; *M. viridis*, F.; *Chrysomela hyperici*, Fourc.; and *Cryptocephalus aureolus*, Suffr.

Near the station a flourishing colony of the somewhat local plant, *Potentilla argentea*, L., was noticed.

The day was sunny and very hot. There had been a long spell of dry weather, but the vegetation was still pleasingly fresh. Six members attended.

8th JULY, 1934.

FIELD MEETING—FOREST ROW.

Leader.—S. N. A. JACOBS.

The same ground as last year was visited, and though there was rather a strong wind blowing, the expected insects were to be found; the usual "Chocolate Tip" larvae in the willows and aspens, and the "Puss" and "Poplar Kitten" larvae on the aspens.

Of *Limenitis camilla*, L. (*sibilla*), two black forms with but two small white spots on the centre of the disc, and one with a whitish suffusion over the central portion of the disc were taken. This species certainly seems to have established itself very securely in this stretch of woodland, and it is to be hoped that it will remain there.

Tea was taken at Forest Row, and some of the party went back to the collecting ground while others returned home but all present spent an enjoyable day in this beautiful part of Ashdown Forest.

12th JULY, 1934.

The PRESIDENT in the Chair.

Mr. C. Bower, of 1, Fleet St., and Mr. G. F. Cole, of 28, Chepstow Place, W.2., were elected members.

The President exhibited a larva of *Catocala nupta*, L., and of various species of *Dianthoecia*.

Mr. Jacobs exhibited imagines, larvae and pupae of *Aphomia gularis*, Zell., to illustrate his paper on the species.

Mr. Hy. J. Turner exhibited a larva of the Sawfly *Rhadinocerea micans*, Knw., found feeding on *Iris pseudacorus*, L., in his garden. The species was common throughout Central Europe. Another species of the genus is met with on the smaller *Iris I. pumila*, Vill., in Austria and S. Russia.

He also exhibited a proliferous flower spike of the garden Scabious, *Centaurea caucasica*, in which a second flower spike had grown from the base of the first flower head.

Dr. Cockayne exhibited preserved larvae of all the British *Dianthoecia* species except *D. caesia*, Bork., and remarked that the larva of *D. andalusica*, Stdgr. (*barrettii*, Dbldy.) was unlike the rest of the species; also larvae of *Nola confusalis*, H.-S. on oak.

Mr. Hawkins exhibited larvae of *Mamestra (Hadena) dentina*, Esp.

from a Stroud ♀. Ova ex. Mr. P. Bainbrigge Fletcher. The ova were laid 11-12.vi.34 and began to hatch 18.vi.34. At present some larvae were feeding and growing very fast, others were still very small.

Dr. K. G. Blair exhibited a stem of *Sedum telephium*, L., from his garden at Hendon with cocoons of *Hyponometa vigintipunctatus*, Retz., and noted that the moths frequently were quite unable to extract themselves from the tangle of web to properly expand their wings.

Mr. Howarth exhibited imagines of the Lasiocampid *Eutricha quercifolia*, L., of which he had found the larvae at Oxshott and one on Canvey Island, feeding on sallow bushes.

Mr. Jacobs read a paper on *Aphomia gularis*, Zell., a dried-fruit pest which had recently come somewhat into notice. (See Trans.)

Among reports of captures and of the season, Mr. Downes had observed *Polygonia c-album*, L., ovipositing on nettle at Horsley. The ova were placed on the edge of the leaf. Dr. Bull had noted *Lycaenopsis argiolus*, L., in E. Sussex, 5th July; *Polyommatus coridon*, Poda, at Shoreham, Kent, 9th July; and *Plebeius aegon*, Schiff., at Eynsford, 9th July. It was noted that *L. argiolus* was of the 2nd brood and that last year a 3rd brood occurred in September. *Leucania favicolor*, Barr., had been common on the Essex marshes, that *L. camilla* was still extending its area of distribution, as also was *Ptychopoda fuscovenosa*, Gz. (*interjectaria*, Bdv.).

15th JULY, 1934.

FIELD MEETING—SOUTH BENFLEET.

Leader.—R. W. ATTWOOD.

Eleven members attended and had a very successful day's collecting. The weather was all that could be desired.

A start was made over the stile on the mainland side of Canvey Bridge along the Railway. The path goes through a disused railway siding. This is a very good collecting area as there is a considerable variety of plants, some quite unusual to the district and evidently introduced as seeds and distributed from the railway trucks. The first plant of Sea Wormwood examined yielded several larvae of *Euchloris smaragdaria*, Fb. The larvae were very small and until one's eyes had become accustomed to the rather

lighter colour of the larval covering, were difficult to discern. *Adopoea lineola*, Ochs. was in abundance everywhere along the sea wall and an occasional *Satyrus* (*Melanargia*) *galathea*, L., and *Maniola tithonus*, L., were seen. A specimen of *Acidalia immutata*, L., was taken on the sea wall and a large number of Microlepidoptera on the marshes.

The Coleopterists and Orthopterists obtained a considerable variety of specimens along the banks of the dykes. The local dragon fly, *Lestes dryas*, Krby. was taken. Two specimens of the Chameleon Fly (*Stratiomys furcata*, F.) were found, both oviposting on the reeds; a peculiar flat greenish mass of ova.

After lunch the party divided, one section working the dykes for pupae of *Nonagria geminipuncta*, Hatch., in the reed stems, the affected reed being indicated by a small "window" in the stem where the imago will emerge.

The other party proceeded to the higher ground after *S. galathea*. These were very common but rather worn. *Zygæna filipendulae*, L. were on every thistle bloom and exceedingly abundant. *M. tithonus*, and *Aphantopus hyperantus*, L., were also common on the brambles. This part of the country is very rough and has not been cultivated for years. It is a wonderful place at times for birds and the Woodcock is frequently seen here in the winter. It is also a good place for insects and particularly grasshoppers. As living specimens of the "Great green grasshopper," *Phasgonura viridissima*, L., were desired, a special search was made and several were soon obtained. The first discovered fastened itself to the finder's finger and the bite was sufficiently powerful to penetrate the skin and draw blood. The Macropterous form of *Metrioptera roeselii*, Hag., was also found in some numbers together with the ordinary form. It was suggested that the abnormally warm dry season might be connected with the appearance of the winged form in England.

Dr. Blair reported on the most interesting insects as follows:—

"Most of the good captures of last year were repeated and a number of additional ones made. Of Orthoptera particularly noteworthy was the fact that *Metrioptera roeselii*, Hag. var. *diluta*, Charp., of which the second British record occurred on this occasion last year, was this year abundant and in both sexes. Of Coleoptera among the noteworthy additions were *Malachius marginellus*, Ol., *Anthicus constrictus*, Curt., *Bembidion varium*, Ol. and *B. ephippium*, Marsh. Diptera included *Stratiomys furcata*, F., together with several masses of its ova on some of which the fine parasitic Chalcid,

Smicra sispes, L., was sitting and apparently ovipositing; also *Nemotelus uliginosus*, L., *Ceroxys pictus*, Mg., *C. crassipennis*, F., and *Urophora stylata*, F., while *Icterica westermanni*, Mg., was subsequently bred from a puparium found in a stem of *Senecio palustris*, De. In addition to the Chalcid mentioned above, other good Hymenoptera were *Aritranis carnifex*, Gr., subsequently bred from a reed stem containing *Nonagria geminipuncta*, Hatch., and quite unexpected were two ♀ ♀ of *Mutilla europea*, L., one crawling in the roadway by Canvey Bridge.

“A nearly full grown larva of *Agdistis bennettii* was also taken.”

The following is an additional list of insects captured:—

LEPIDOPTERA.—*Nygmia phaeorrhoea*, Haw. (*Euproctis chrysorrhoea*, L.), *Homoeosoma sinuella*, Fb., *H. binaevella*, Hb., *Hemimene politana*, Hb., *H. petiverella*, L., *Eucosma brunnichiana*, Frol., *Ochsenheimeria birdella*, Curt.

COLEOPTERA.—*Malachius viridis*, Fb., *Leptura livida*, Fb., *Rhago-nycha fulva*, Scop., *Lagria hirta*, L., *Cassida rubiginosa*, Müll., *Sphaeroderma testaceum*, Fb., *S. sulcifrons*, Thnbg., *Oedemera lurida*, Thnbg., *Coccinella 22-punctata*, L., *Coccidula scutellata*, Hrbst.

ORTHOPTERA.—*Conocephalus dorsalis*, L., *Stauroderus bicolor*, Charp., the series including all three colour forms *mollis* (green), *purpurascens* (reddish purple) and *nigrina* (dark), *Omocestus viridulus*, L., *Chorthippus elegans*, Charp.

PARANEUROPTERA (ODONATA).—*Sympetrum sanguineum*, Müll.

26th JULY, 1934.

Mr. E. E. SYMS, VICE-PRESIDENT, in the Chair.

Mr. Bliss exhibited larvae of *Arctia villica*, L., and of *Diacrisia sannio*, L., and reported the capture of a female *Apatura iris*, L., in Surrey, the 2nd brood of *Leptidea sinapis*, L., the occurrence of *Polygonia c-album*, L., of *Limenitis camilla*, L., (*sibilla*, L.) and of *Dryas (Argynnis) paphia*, L., also in Surrey.

Mr. White exhibited one of the forms of the larva of *Sphinx pinastri*, L. It was subsequently remarked that the larvae of this species were very variable.

Dr. Williams exhibited the pale typical form of *Acronicta psi*, L., from the W. of England, the ab. *suffusa*, Tutt, from the London district, and an extremely dark form of the latter aberration from Hampton, 1934. Also he showed young larvae of *Apatela aceris*, L., of a black and white combination.

Mr. Robert Adkin exhibited a series of *Chloroclystis rectangulata*, L., taken in his garden at Eastbourne. These specimens were chiefly of the typical green form, but varied through darker shades to almost wholly dark-sooty, closely approaching but not quite so dark as the melanic London form, *nigrosericeata*, Haw., specimens of which were shown for comparison.

Mr. S. Wakely exhibited a specimen of *Brenthis euphrosyne*, with the ground colour of pale straw instead of the usual tawny tint. Also various ichneumons bred from the following hosts: *Lycaenopsis argiolus*, L., *Rumicia phlaeas*, L., *Eupithecia arceuthata*, Fr., *Ennomos fuscantaria*, Steph., *Oidaematophorus (Pterophorus) lithodactyla*, Tr., and *Telphusa notatella*, Hb. A specimen of the local lace-wing fly *Osmylus chrysops*, Röm., taken at the Ashdown Forest Field Meeting was also included, as well as small parasitic flies, *Telenomus phalae-narum*, Nees., bred from ova of *Clisiocampa castrensis*, L., from Burnham on Crouch, Essex.

Dr. H. King showed 2 pupa cases of *Synanthedon (Sesia) andrenae-formis*, Lasp., in a short stem of *Viburnum opulus*, L., and larvae of *Cucullia lychnitis*, Rmbr., on *Verbascum nigrum*, L., both from the Chiltern Hills, Bucks.

Mr. Bunnett exhibited the Coleoptera *Athous villosus*, Fourc. (*rhombus*, Ol.) and *Mordella fasciata*, Fb., and on behalf of Mr. G. J. Sard of Balham, an asymmetrically marked specimen of *Brenthis selene*, L., from Ashdown Forest, 18.vii.34.

Dr. Cockayne exhibited the larva (of German origin) of *Zygaena purpuralis*, Brunn., and remarked that they differed in colour from larvae of this species, which he had had from Galway. He noted that the larva figured by Spuler was bluish white in the ♂ and pale yellow in the ♀; that of Buckler from Galway was dark olive green; that of Boisduval was yellow; while the ground colour (skin) of those he was exhibiting was definitely white.

Mr. Coote exhibited pupae of *Ruralis betulae*, L., from Chiddingfold larvae, several of which pupated on the same leaf.

Mr. Downes communicated the following observations:—"On 20th August, 1928, I was collecting in the Quantock Hills, Somerset, and found many very worn but large specimens of *Eumenis semele*, L. Four days later I returned and found in addition to the specimens already mentioned, some very small and quite fresh ♂s of the same species, and by 27th August there were small fresh specimens of both sexes.

"Yesterday I had a similar experience with *Maniola jurtina*, L.,

at Ranmore, Surrey. There were many normal sized specimens, all of which were badly worn. Besides these, there were a lot of small and quite fresh specimens.

"I do not know the explanation of these observations. If they mean that the small fresh specimens are 2nd brood ones overlapping the last of the parent brood, this is surely very peculiar in the case of *semele*. However, it may indicate that one brood has emerged in 2 distinct portions, in which case why the later portion is composed of small specimens is not quite clear."

Polygonia c-album, L., young larvae from the Horsley eggs shown last meeting.

"*P. c-album* is still spreading rapidly: I watched one ovipositing at Wimbledon recently, and it has now become common in East Sussex—several have been taken in Abbots Wood and Lewes this year, and it is abundant at Uckfield. At Uckfield last week, I saw but missed a very extraordinary form of this species,—so far as I could see the ground colour was clear orange brown, and there was just one large irregular black spot on each wing."

Mr. Jacobs reported that he had seen a *Dryas (Argynnis) paphia*, L. in Fenchurch Street, and that *Lycaena arion*, L., was scarce this year in its North Cornwall habitat.

9th AUGUST 1934.

Mr. C. M. DE WORMS, VICE-PRESIDENT, in the Chair.

Mr. Dennis exhibited a full grown larva and a pupa of *Limenitis camilla*, L. (*sibilla*, L.) from ova received on 12th July from Mr. A. L. Rayward, Eastbourne, and noted that the young larva in its first skin attached frass to its spines. He also showed a photograph of it in this disguise.

Mr. C. M. de Worms exhibited larvae of *Moma alpium*, Osb. (*orion*, Esp.), *Cerura bifida*, Hb. and *Lithosia sororcula*, Hufn., with *Acidalia immorata*, L. bred from Sussex ova. He reported *Colias croceus*, Frery. (*edusa*, Fb.) from the S. Coast in July, that the 2nd brood of *Polyommatus thetis*, Rott. was out, that *P. coridon*, Pod. was common, but that *Polyommatus icarus*, Rott. was scarce so far.

Mr. Fletcher exhibited the larvae of *Hydrelia uncula*, Clrck. obtained on 2nd August at Esher by beating sedge.

Mr. A. P. O'Farrell exhibited a short series of *Petillampa arcuosa*, Haw. and read the following note.—"I am showing a few specimens

of *P. arcuosa*, including four females which were taken on Wimbledon Common on 27th July. In about half-an-hour I obtained over a dozen specimens of the female, and as this sex is normally rather rare, even though the male occurs in considerable abundance, some notes on the habits of the species may be of interest. We found them soon after dusk on a patch of rough marshy ground covered with a rank growth of grasses and rushes. The males were flying in great abundance particularly near one spot, and soon afterwards a pair *in cōp.* was found close by. As none of us had previously encountered the female, this set us searching, and soon several more pairs were found, all of them being rather close to the ground on rush stems; short stems overhanging paths or other bare parts of the ground were preferred to those in the rank grass. Some females were found very freshly emerged and apparently unable to fly. These sat higher up on the rush stems about a foot from the ground, and their presence was indicated by a number of males flying about.

"I observed one pairing take place, and noted that the moths at once let themselves drop from the taller stem, on which the female had as usual been sitting, on to a short stem about three inches off the ground. One pair, however, was found quite high up; but in general the secret of finding the females appears to be in searching much lower down than the males usually rest, at an average height of about six inches from the ground. The ♀ seems to be always the uppermost of the pair, and as will be seen from those in my exhibit, is very distinct from the male in size, shape, and markings. It may be interesting to note that my dates for the ♂ of this species range from 15th June to the first week of August, but this is the only occasion on which I have seen the female."

He also exhibited (from the Benfleet field meeting) the scarce fly *Stratiomys furcata*, F., the dragonfly *Lestes dryas*, Krby., and some larvae of *Euchloris smaragdaria*, Fb. Also from the Effingham district larvae of *Gastropacha quercifolia*, L., *Nonagria typhae*, Esp., and *Mysticoptera sexalisata*, Hüb.

Dr. K. G. Blair exhibited:—1. A living larva of *Deilephila (Celerio) gallii*, Rott., black form.

2. Living specimens of *Ibalia leucospoides*, Hochnw. (*cultellator*, Latr.) parasite of the wood-wasp, *Sirex gigas*, L.

3. A living musk beetle, *Aromia moschata*, L.

4. A piece of stem of birch with gall of *Epiblema tetraquetra*, Haw. (*Tortricidae*), received from Dr. H. King.

Last autumn Dr. H. King had observed something black moving within the hole, but this was subsequently covered with a silken cap. In May last Dr. King told him that the beast had come out but had escaped, and he did not know what it was.

On splitting the stem through the hole, it was seen that the swelling was caused by a proliferation of the tissue beneath the bark but scarcely encroaching upon the wood. It was thus a 'gall' strongly reminiscent of that formed on Aspen twigs by the Dipteron *Agromyza schineri*, Gir. It is probably the gall represented, though on thinner stems, by Connold, "Plant Galls," No. 43, but undetermined.

Within the gall is a silken chamber with plenty of space all around but the silken wall firmly secured around the opening. In the spaces around this chamber was a cast larval skin, and a quantity of frass. Meyrick says of the larva of *L. tetraquetra* 'on birch and alder (when young in swellings in twigs).' Putting these various items together it would seem that the young larva forms the gall in the stem, and after moulting, spins the silken hibernation chamber which it quits about May to feed upon the young leaves.

Mr. T. G. Howarth exhibited larvae of *Arsilonche albovenosa*, Göze. obtained from the Brandon district in July.

Mr. S. Wakely exhibited a large irregularly shaped cocoon of *Saturnia pavonia*, L. which had two pupae inside. The larvae were from Broadwater Forest.

Mr. Craufurd exhibited an example of the large Ichneumon, *Rhyssa persuasoria*, L., which is attached to the wood wasp *Sirex gigas*, L., of the pine tree.

Mr. Robert Adkin exhibited a series of *Agrotis corticea*, Hüb. taken at light in his garden at Eastbourne in June-July last. They showed considerable variation but were chiefly of the lighter coloured forms. He also showed an unusually dark grey specimen of *A. exclamatoris*, L. taken in the same way.

Mr. C. N. Hawkins exhibited:—1. Some examples of delayed emergence from larvae taken in July and August, 1932, which seemed surprising in view of the unusually fine and warm summer of 1933. The pupae were kept throughout in a cage in which other members of the same species emerged, as expected, in 1933.

Nyssia zonaria, Schiff., from larvae found by Mr. H. Brocklesby at Llandudno in July 1932. 2♂♂ and 1♀ emerged April, 1934. (This species is known to lie over at times).

Chesias rufata, Fb. Larvae from Barnes Common, August, 1932. 1♂, 3♀ emerged April-May, 1934.

Pseudopanthera macularia, L. Larvae from Box Hill, July, 1932. 1 ♂, 3 ♀ emerged in May, 1934.

Helica (*Heliodes*) *tenebrata*, Sc. Larvae from Chiddingfold, etc., in July, 1932. 1 ♂ emerged in May, 1934.

2. Living larvae of *Polyommatus* (*Lysandra*) *bellargus*, Rott. Ranmore Common district. Found 30.vii.34, buried deeply in clumps of *Hippocrepis comosa*, or just beneath surface of ground under the clumps.

Living larvae of *Eustrotia* (*Erastria*) *uncula*, Cl., Surrey. Obtained 2.viii.34, by sweeping sedge or beating it into the net.

Living larvae of *Parasemia plantaginis*, L., Cranham. Bred ab ovo, ♀ taken by Prof. T. Bainbrigge Fletcher, ova laid 3.vi.34, hatched 16.vi.34. Some larvae had already pupated at date of meeting and were expected to produce 2nd brood imagines. (NOTE.—The first imago emerged on 12th August, 1934).

Dr. Bull exhibited larvae of *Chariclea umbra*, Hufn. and reported the occurrence of *Colias hyale*, L. near Newmarket and a few *Pyrameis cardui*, L.

Mr. Attwood exhibited larvae of *Selenia lunaria*, Schiff. from Benfleet.

11th AUGUST, 1934.

FIELD MEETING—EYNSFORD.

Leader.—K. G. BLAIR, D.Sc., F.R.E.S.

The route taken was practically that of last year, and though some species then recorded, notably *Drepana cultraria*, Fb. and *Eutricha quercifolia*, L., failed to put in an appearance, many interesting additions were made. A heavy shower about lunch time did not damp our enthusiasm in beating for larvae of *Lophopteryx cuculla*, Esp., though most of these fell into one tray. Five members were present in the morning while four more turned up at the Testing range in the afternoon.

Of Lepidoptera some 30 species, including larvae, were listed; among the more notable being *Colias hyale*, L. (1), *Argynnis paphia*, L. and *A. aglaia*, L., *Pyrameis cardui*, L. *Eumenis* (*Satyrus*) *semele*, L. *Lycaenopsis argiolus*, L., the last two worn, and fresh (third brood?) *Polyommatus coridon*, Pod. *Urbicula comma*, L. *Phragmatobia fuliginosa*, L. *Crocallis elingvaria*, L. *Lygia adustata*, Schiff. and *Cidaria bicolorata*, Hufn. (in a lamp on the station platform), whilst larvae included *L. cuculla*, *Hemistola* (*Euchloris*) *chrysoprasaria*,

Esp. (*vernaria*, Hb.), *Eupithecia haworthiata*, ¹Dbldy. *Hydrelia flammeolaria*, Hufn. (*luteata*, Schiff.), *L. adustata*, *Plagodis dolabraria*, L. (1), *Myelois cribrum*, Schiff. and *Leioptilus* (*Pterophorus*) *carphodactyla*, Hb. in the flowerheads of *Inula conyza*, D.C.

Coleoptera were not numerous but included *Lema cyanella*, L. (*lichenis*, Voet.), *Cryptocephalus labiatus*, L. and *pusillus*, Fb., *Gastroidea polygoni*, L., *Epitrix atropae*, Foud. and *Xylocleptes bispinus*, Duft., whilst some seed-heads of Centaury (*Erythraea*) subsequently produced a small weevil, *Smicronyx reichi*, Gyl.

Of Diptera *Ensina sonchi*, L., was swept from Ragwort blossom and subsequently bred from seed-heads of *Sonchus arvensis*, L., while some heads of *Carduus crispus*, L., produced *Trypeta serratulae*, L. and parasites (*Braconidae*).

Three species of long-horned grasshoppers were met with, *Pholidoptera griseoptera*, DeG., being additional to last year's list.

Two interesting galls were also noted, both caused by Cecydomyiid flies, viz. *Oligotrophus corni*, Gir., a large green and red gall on the leaves of Cornel, not given in Connold's 'Plant Galls,' and *Atrichosema aceris*, Kieff., forming a swelling on the petiole of Maple (Connold, No. 150, undetermined.)

Mr. F. J. Coulson reported the following additions:—

COLEOPTERA.—*Longitarsus obliteratus*, Ros. on marjoram; *Lema puncticollis*, Ct. from thistles; *Cryptocephalus fulvus*, Gze., *Centhorrhynchus assimilis*, Payk., *C. pleurostigma*, Marsh., *Apion hookeri*, Kby. and *A. punctigerum*, Payk. by general sweeping.

HEMIPTERA HETEROPTERA.—*Picromerus bidens*, L. and *Nabis apterus*, F., from hazel; *Liocoris tripustulatus*, F., *Heterotoma meriopterum*, Scop., *Campyloneura virgula*, H.-S., and *Nabis limbatus*, Dahlb. from nettles.

HEMIPTERA HOMOPTERA.—*Agallia venosa*, Fall. and *Acocephalus nervosus*, Schrk., both commonly.

Mr. H. W. Andrews reported on the Diptera as follows.

"Mr. O'Farrell made a most interesting capture, viz.:—*Tabanus glaucopis*, Mg., new to Kent so far as I am aware. [See 'Ent. Record,' p. 125 (1934)]. I took a number of *Tachinidae* most of which have still to be worked out, otherwise there were not so many species noted as might be expected considering the varied nature of the ground traversed."

The following species were identified:—*Pipunculus nigritulus*, Zrt. *Paragus tibialis*, Fln. *Sciomyza obtusa*, Fln. *Asilus crabroniformis*, L. *Ernestia radicum*, F. *Phryxe vulgaris*, Fall. *Macquartia tenebricosa*, Mg. *Tabanus glaucopis*, Mg.

23rd AUGUST, 1934.

The PRESIDENT in the Chair.

Mr. Coulson exhibited some of his captures at the Eynsford Field Meeting, on 11th August, and also a blackish blue aberration of the Coleopteron *Lema puncticollis*, Curt., taken at Bookham on 9th July; a *Podagrica fuscicornis*, L., with blackish red thorax, legs and base of antennae, from Pegwell Bay on 18th July; and an aberration of *Cateretes rufilabris*, Latr., the dark form with left elytron of the light form, from Newchurch, I. of Wight, 18th July.

Mr. Dennis exhibited a living *Limenitis camilla*, L. (*sibilla*, L.) bred from an egg laid about 20th June. Imago emerged 20th August. Also an Asparagus beetle, *Crioceris asparagi*, L., in cocoon ready to emerge.

Mr. Robert Adkin exhibited a short series of *Nepticula suberivora*, Stt., a species discovered by the late Profr. Waters in the Isle of Wight in 1927 (*E.M.M.*, 1928, p. 1). He said that Mr. Fassnidge very kindly sent him, in March last, a few leaves of *Quercus ilex* containing larvae of this species which enabled him now to exhibit the moth, the leaves showing the mines made by the larvae and the pupal cocoons.

He also exhibited an Agrotid taken at light in his garden at Eastbourne on 5th July last which in superficial appearance closely resembled *Agrotis exclamationis*, L., the wings being devoid of the mottling usually present in *A. corticea*, Hb. The heavy pectination of the antennae, however, suggested a close connection with the latter species.

Dr. K. G. Blair read a preliminary report of the Field Meeting at Eynsford and made the following exhibits:—(1) Both sexes of the macropterous form of *Metrioptera roeselii*, Hag. var. *diluta*, Charp. taken on the occasion of the Benfleet Field Meeting, when this form was found to be nearly as abundant as the normal form. In view of the suggestion mentioned last year that these macropterous forms of species, usually brachypterous, never become sexually functional, a ♀ of each form was subsequently dissected. The brachypterous ♀ contained well developed though immature eggs, but no trace of such was found in the macropterous ♀. Owing to the possibility that they might yet be too young, a ♀ of each form was kept alive with two macropterous ♂♂, and on the 18th of July at 9 a.m. one of these ♂♂ was seen to be *in coitu* with the brachypterous ♀.*

* For further report see "Ent. Mo. Mag.," 1934, p. 259.

After this the body of this ♀ became much swollen whereas that of the macropterous ♀ remained similar in size to those of the ♂♂. It does not follow perhaps that the act of coition proves the sexual maturity of the ♂; this will only be proved if fertile ova are laid by the ♀, but the distension of her abdomen is doubtless due to the development of the ova, even if infertile, within it, while obviously no such development has taken place in the case of the macropterous ♀.

(2) *Smicra sispes*, L. one of the giants among the *Chalcididae*, also from Benfleet. On several occasions a ♀ was noted sitting upon an egg-mass of *Stratiomys furcata*, Mg. in which she was presumably ovipositing. The young larvae emerged from one of these egg masses within a few days, so that it would appear that any ova deposited by the *Smicra* must remain dormant during a great part of the larval life of *Stratiomys*.

(3) The Trypetid fly *Ictericia westermanni*, Mg. reared from a puparium found by Mr. Wakely in the root of *Senecio aquaticus*, Huds. at the Benfleet Field Meeting.

(4) Living examples of the "plume" *Leioptilus* (*Pterophorus*) *carphodactyla*, Hb. reared from larvae found in the flower-heads of *Inula conyza*, D.C. at the Eynsford Field Meeting. Of this species there appear to be but few British records. It was introduced to the British list by W. Purdey ("Ent. Rec." 19, 1907, p. 78) on examples taken at Folkestone, and specimens were exhibited by Dr. Chapman at the Entomological Society on 6th March, 1907. On June 5th of the same year he exhibited living specimens reared from larvae found by Mr. Ovenden. Other localities are Rochester and Sandown, Isle of Wight (L. B. Prout). The species is thus double brooded, but no information is given in the records quoted as to how the larvae of the first brood feed, and at that time of year the flowering stems have not grown up. Tutt, in an editorial note to Purdey's article, states that the foodplant, presumably referring to the behaviour of the species on the continent, is *Conyza squarrosa*, D.C.* Kaltenbach says that larvae of the first brood burrow into the leaf bases of the plant.

(5) Galls of *Oligotrophus corni*, Gir. on Cornel, and of *Atrichosema aceris*, Kieff. on the leaf petioles of Maple, both from Eynsford.

(6) Living Chalcids reared from a larva of *Lophopteryx cuculla*, Esp., from Eynsford, to show the peculiar pupae of this group of parasites (*Eulophinae*).

Mr. Line exhibited a larva of *Stauropus fagi*, L., which he had

* Alternative name for *Inula conyza*.

taken at Shoreham, Kent, on hazel, a somewhat unusual food-plant. Various other foodplants were mentioned including aspen, oak, hawthorn, apple, birch, beech, hornbeam, willow.

Dr. Joy reported the abundance of *Phyllotreta* beetles on garden produce.

Dr. Bull made the following report of recent observations in the field:—"I have just spent 10 days in the New Forest and Dorset. The large Argynnis, *Limenitis camilla*, L. (*sibilla*, L.) and *Aphantopus hyperantus*, L., were all past their best. The nights were clear and cool, so light was not very productive. I only took one *Oenestes quadra*, L., of which species several had been captured earlier. Sugar provided one *Catocala sponsa*, L. and large numbers of *Xylophasia monoglypha*, Hufn., *Triphaena pronuba*, L. and *Apamea secalis*. In the marshes *Tholomyges turfosalis*, Wk., was abundant while *Hypenodes costae strigalis*, St., and *H. taenialis*, Hb. (*albistrigalis*, Haw.) also appeared. In the Swanage district the recent fire had destroyed some good collecting ground. *Polyommatus coridon*, Poda, was scarce, larvae of *Hyloicus pinastri*, L., were beaten full fed and *Agrotis vestigialis*, Hufn., in its local form was taken both at light and sugar. In Cambridgeshire *P. coridon* was plentiful on Fleam Dyke on 8th August, and a *Colias hyale*, L., was taken.

Reports were made of *C. hyale*, L., odd specimens, *Lgcænopsis argiolus*, L., in number, *Polygonia c-album*, L., etc.

13th SEPTEMBER, 1934.

The PRESIDENT in the Chair.

The decease of Mrs. M. L. Brooke was announced.

The President exhibited an aberration of *Opisthograptis luteolata*, Linn. in which the costa was marked with brown; living larvae of *Iodis lactearia*, Linn., *Selenia tetralunaria*, Hufn., and *Lomaspilis marginata*, L.

Mr. G. Brett exhibited some fungi collected the previous day at Etchingham in a garden of $2\frac{3}{4}$ acres, nearly 2 acres of which is still waste woodland. About 40 different kinds were included.

Mr. F. D. Coote exhibited a series of *Acidalia marginipunctata*, Goeze, and communicated the following Note.

"Early in July I took a very dark Geometer at Bude, Cornwall, which I concluded was *A. marginipunctata*. It was worn but laid ova in the box. They hatched within a fortnight.

"A few days later I took another blackish insect, very worn, which I assumed to be the same species, but of the black form which South mentions as occurring in Cornwall. It also laid several eggs but in this case at least 3 weeks elapsed before they hatched.

"Both hatches of larvae appear to be hibernating and seem to be dissimilar."

Mr. S. Wakely exhibited larvae of *Hydriomena ruberata*, Frr. from the Isle of Wight; of *Malacosoma castrensis*, L. and of *M. neustria*, L. with parasites of the former; and a melanic form of *Hemerophila abruptaria*, Thnbg.

15th SEPTEMBER, 1934.

FIELD MEETING.—BOX HILL.

Leader.—J. A. DOWNES.

The Box Hill Field Meeting was held on Saturday, 15th September, in very fine, but rather too warm, weather. The complete party consisted of 23 (17 members and 6 visitors) which is the largest attendance for several years, and although many were collecting Lepidoptera, others were interested in Coleoptera, Neuroptera, Hemiptera and Orthoptera. The ages of those attending ranged from about 9 upwards, which seems to be another record.

There were 18 in the morning party, which worked up to the woods at the top of the Hill, where lunch was taken. After lunch the afternoon party (5) joined them in Juniper valley, where all collected until tea time. Tea was at 5.30 at the Railway Arms as usual. After this most went home, but 3 members returned to Juniper valley and sugared some trees there. Although not a single moth was attracted, it made an interesting ending to the day.

The following is a List of the Species reported :—

COLEOPTERA :—GEODEPHAGA.—*Dromius 4-maculatus*, L.; *D. 4-notatus*, Pz. frequent under bark; *D. melanocephalus*, Pz. common; *Asaphidion (Tachypus) flavipes*, L. among beech leaves.

BRACHELYTRA.—*Othius myrmecophilus*, Kies. and *Quedius tristis*, Gr. common under fallen beech leaves; *Phyllodrepa vilis*, Er. common under bark.

LAMELLICORNIA.—*Sinodendron cylindricum*, L. common in birch stump; *Aphodius rufipes*, L. and *Onthophagus ovatus*, L. common in dung.

CLAVICORNIA.—*Coccinella bipunctata*, L.; *C. 10-punctata*, L.; *C. 7-punctata*, L.; *Calvia 14-guttata*, L.; *Chilocorus bipustulatus*, L.; *Meligethes obscurus*, Er.; *M. planiusculus*, Heer. from *Echinum vulgare*.

RHYNCHOPHORA.—*Cionus thapsus*, Fb. common; *Centhorrhynchus geographicus*, Gze.; *Apion onopordi*, Kirb.; *A. rubens*, Steph.; *A. flavimanum*, Gyll.; *Otiorrhynchus sulcatus*, Fb.; *Strophosomus melanogrammus*, Forst.

PHYTOPHAGA.—*Sermyla halensis*, L.; *Hermaphysa mercurialis*, Fb., common on Mercury; *Galerucella viburni*, Pk., from *Viburnum lantana*; *Longitarsus obliterated*, Rosh., from Marjoram; *L. tabidus*, Fb.; *L. luridus*, Scop.; *L. membranaceus*, Foud.; *Chrysolina polita*, L., common; *Cryptocephalus aureolus*, Suf.; *C. bilineatus*, L.; *Lochmaea crataegi*, Forst.; *Timarcha coriaria*, Laich. Total 34 spp.

LEPIDOPTERA (Imagines).—PAPILIONINA.—*Gonepteryx rhamni*, L.; *Polygonia c-album*, L., several; *Pyrameis atalanta*, L.; *Aglais urticae*, L.; *Pararge aegeria*, L., single specimen only; *Epinephele jurtina*, L.; *E. tithonus*, L.; *Coenonympha pamphilus*, L.; *Thecla quercus*, L.; *Polyommatus icarus*, Rott.; *Urbicola (Angiades) comma*, L.

NOCTUAE.—*Amathes circellaris*, Hufn.; *Tholera popularis*, Fb.; *T. cespitis*, Fb.; *Cerapteryx graminis*, L.; *Xanthia fulvago*, Fb.; all odd specimens found by day.

GEOMETRAE.—*Anaitis plagiata*, L., and/or *efformata*, Gn.; *Acidalia ornata*, Scop.; *Aspitates gilvaria*, Schiff.

(LARVAE) NOTODONTIDAE.—*Notodonta dromedarius*, L.; *Pheosia dictaeoides*, Esp.

CHLOEPHORIDAE.—*Hylophila prasinana*, L.

DREPANIDAE.—*Drepana falcataria*, L.; *D. lacertinaria*, L.; *D. cultraria*, Fb.

NOCTUAE.—*Craniophora ligustri*, L., a few late ones; *Acronicta psi*, L.; *Demas coryli*, L.; *Plusia chrysitis*, L.; *Abrostola triplasia*, L.; *Euclidia mi*, Clrck.; *Aventia flexula*, Schiff., on lichen on yew and sloe.

GEOMETRAE.—*Cosymbia (Ephyra) trilinearis*, L.; *Ligdia adustata*, Schiff.

NEUROPTERA.—At least 3 spp. of Chrysopid larvae.

MECOPTERA.—*Panorpa germanica*, L. ♀, 2nd brood.

ORTHOPTERA.—Acridiidae.—*Tettix bipunctatus*, Linn.; *Stenobothrus lineatus*, Panz., common—also nymphs; *S. rufipes*, Zett., common; *Omocestus viridulus*, Linn.; *Stauroderus bicolor*, Charp., many forms including var. *purpurascens*, Fieb.; *Chorthippus parallelus*,

Zett.; *Gomphocerus rufus*, Linn., locally common: *G. maculatus*, Thunb.

LOCUSTIDAE.—*Leptophyes punctatissima*, Box.; *Meconema thalassina*, Degeer.

BLATTIDAE.—*Ectobius livida*, Fb. (*perspicillaris*, Hbst.), F., nymphs chiefly from juniper and yew.

HEMIPTERA—HETEROPTERA.—*Acanthosoma haemorrhoidale*, L., common on birch, etc.; *Cyphostethus tristriatus*, Fb., on juniper; *Elasmotethus griseus*, Fieb., common on oak; *Stygnocoris pedestris*, Fall., common among fallen leaves; *Drymus brunneus*, Sahlbg., and *D. pilicornis*, F., among fallen leaves—uncommon; *Phytocoris varipes*, Boh., common; *P. tiliae*, Fb., rare; *Dictyonota tricornis*, Schr., among *Mentha*—uncommon; *Palomena prasina*, L.; *Gonocerus acuteangulatus*, Göze.; *Ploiariola vagabunda*, L.; *Myrmus miriformis*, Fall., common by sweeping.

HOMOPTERA.—*Trichopsylla walkeri*, Fst., common on *Prunus spinosus*; *Psyllopsis fraxini*, L., on ash; *Eupteryx vittatus*, L., frequently among *Labiatae*; *Issus coleoptratus*, Fb.

27th SEPTEMBER, 1934.

The PRESIDENT in the Chair.

Mr. L. O. Grocock, of Addiscombe, was elected a member.

The President exhibited the leaves of walnut galled by a mite, *Eriophyes tristriatus*, var. *erinea*, Nal., and an imago and nymphs of the small cockroach, *Ectobius livida*, F., obtained at the Box Hill Field Meeting. Also a larva of the "Leopard Moth," *Zeuzera pyrina*, L. in a branch of apple from Enfield, and a bunch of clustered catkins of hazel, an example of fasciation, from Enfield.

Mr. Wakely exhibited a *Leucania albipuncta*, Fb. taken on Ashley Down, Isle of Wight, 22nd August.

Mr. Wainwright exhibited the *radiola*, Steph. ♀ form of *Agrotis puta*, Hb. in which the central area is paler.

Mr. Bliss exhibited a species of *Cassida* (Col.), *Pseudomesomphalia goderi*, Boh., taken among bananas from Brazil.

Rev. R. E. E. Frampton, exhibited the following aberrations of common Tortrices, etc.—*Ephestia lutella*, Hb., from Australian currants, 7 forms; *Argyroplote variegana*, Hb., v. *nubiferana*, Haw., and another; *A. lacunana*, Dup., and a black form; *Pandemis corylana*, Fb., unicolorous yellow from Cornwall; *P. heparana*,

Schiff., five forms; *Cacoecia xylosteana*, L., pale and dark forms; *Argyrotoxa conwayana*, Fb., var. *subaurantiana*, Stt., and 3 others; *A. bergmanniana*, L., typical, and from N. Ireland pale yellow and intermediate forms.

Dr. Blair exhibited the beetle *Mononychus punctum-album*, Hbst. (*pseudacori*, Fb.) obtained from *Iris foetidissimus*, in the Isle of Wight and communicated notes on the occurrence.

Mr. C. N. Hawkins exhibited :—

1. A short series of *Hapalotis* (*Erastria*) *fasciana*, L. (*fuscula*, Bkh.) from Bookham and Byfleet, showing variation in shape, size and colour of the pale patch at anal angle of forewings.

2. A short series of *Hydrelia* (*Erastria*) *uncula*, Cl. (*uncana*, L.), from Surrey.

3. Two specimens of *Thyatira batis*, L. taken on Wimbledon Common in July last, one of which has the usual pink suffusion on the spots of the forewings while the other has no pink colour.

4. Two larvae of *Abrosyne* (*Gonophora*) *derasa*, L. from Wimbledon Common, one with a single pair of spots on the 1st abdominal somite, the other asymmetrical, having in addition, a spot on the 2nd abdominal somite on the right side, but not on the left.

Mr. J. A. Downes exhibited :—

1. The Dragon-fly *Anax imperator*, Leach, nymphs, now nearly full grown, and presumably 15 months old—that is, if the total length of life is 2 years, as seems likely. It was noted that the nymphs were totally free from the algae and mud that commonly covers Anisopterid nymphs, and this is probably to be correlated with their more active habits. Whereas many Anisopterid nymphs live chiefly among the dead leaves on the bottom of the pond, it seems probable that *A. imperator* spends a good deal of its time swimming. In captivity at least it swims strongly folding its legs down beside the body and shooting water out of the rectal chamber. This observation was made at the Pen Ponds early this year.

2. Nymphs and adults of *Nepa* and *Ranatra* (Hem.) from the Pen Ponds, Richmond. Both are found fairly commonly and *Ranatra* can easily be spotted as it wanders among the water-weeds. An interesting point concerning both these genera is that although the nymphs and adults are similar in most ways the method of breathing differs. Each however takes in air through the open tip of the siphon which usually projects through the water skin. But in the

adult the siphon is a completely closed tube and has 2 spiracles situated at its base and all the other abdominal spiracles being closed or rudimentary.

In the nymphs the siphon is open ventrally but this opening is covered by a double fringe of hairs so that no water enters. When this incomplete tube reaches the end of the abdomen proper it forks and the resulting two grooves run along the underside of the abdomen until the thorax is reached. These grooves are similarly covered by a fringe of hairs and into them a complete series of abdominal spiracles open, instead of just a pair at the base of the siphon. The grooves mentioned are formed between the terga (which are partially reflexed on to the underside) and the sterna which form the central part of the underside.

Dr. Bull exhibited parasites he had bred from the larva of *Leucania pallens*, L., and their common puparium.

Mr. Downes read his Preliminary Report of the Field Meeting held at Box Hill on 15th Sept.

Mr. Coulson exhibited the Coleoptera, Heteroptera and Homoptera he had taken at the Field Meeting at Box Hill.

Messrs Jacobs, Turner and Wakely read short papers on the Micro-lepidoptera dealing with different aspects of the subject. (See Trans.)

Dr. Cockayne read a short paper on "An Anal Comb in a Micro-lepidopterous Larva." (See Trans.)

11th OCTOBER, 1934.

The PRESIDENT in the Chair.

Mr. Eagles exhibited the Coleoptera *Aulonium trisulcum*, Geoff. found at Nazing, Essex: two species of *Scolytus* upon which it preys and the Longicorn *Pogonochaerus hispidus*, L., obtained from Holly at the Chilworth Field Meeting, 12th May.

Mr. H. Moore exhibited the larvae of the beetle *Dermestes vulpinus*, Fab. which had been found damaging python skins consigned to Messrs Bevingtons and Sons, leather merchants in the Borough, for tanning. They are fairly common in some kinds of fur skins but rarely seen on python skins.

Mr. H. W. Andrews exhibited three species of Trypetid Diptera taken recently by himself: *Urellia stellata*, Fuess., *U. eluta*, Meig., and *Icterica westermanni*, Meig.

Mr. Hy. J. Turner exhibited three species of *Rhopalocera* he had received in a letter from a correspondent in Ecuador. (1) *Gynaecia dirce*, Dbldy., a common species occurring over almost the whole of S. America, of which scarcely any trace of local variation is recorded. (2) *Heliconius melpomone*, L. ssp. *aglaope*, Fb., with the typical form for comparison. The latter is a plain deep black insect with a broad, somewhat irregular, band of orange red across the disc of the forewing, but the subspecies has the forewings with a large basal area of the orange-red colour, and a subapical yellow irregular partial band on the forewings, and the hindwings with a basal inner-marginal orange-red elongated blotch and a series of rays of the same colour to the outer margin. This form is so dissimilar as to appear a totally distinct species were it not for the abundant transitional forms between these two extremes. (3) *Dione vanillae*, L. ssp. *lucina*, Fldr., with the typical form and an allied species *D. juno*, Cr., for comparison. The subspecies is characterized by a large suppression of the silver markings on the underside of both wings and the close resemblance of the upperside to the allied species *D. juno*, with which it was formerly confused.

Dr. K. G. Blair exhibited two exotic beetles recently found in the open in Britain:—(1) *Megadytes costalis*, Aub., a Brazilian species, found dead in the mud of a pond at Mill Hill, by W. O. Steel. (2) *Ochotyra semiusta*, Pasc. ♂, found by Dr. E. H. Newton crawling in short grass on the cliffs near Brighstone, I. of Wight. The species is a native of S. India and Ceylon and belongs to the family *Rhagophthalmidae*, allied to the *Lampyridae*, and like them having an apterous and luminous female.

Mr. C. N. Hawkins exhibited:—1. *Dianthoecia carpophaga*, Bkh. from Eastbourne, Dungeness, Chalfont St. Giles and Box Hill, to show local variation.

2. Living larvae of the following *Eupithecia* species, viz.:—*castigata*, Hb. from Oxted; *pimpinellata*, Hb. (forms) from Box Hill; and *exiguata*, Hb. from Riddlesdown.

Dr. Cockayne exhibited the larvae of *Eupithecia pimpinellata*, Hb. feeding on Saxifrage species and a bred series of *Cirrhia citrigo*, L. from Surrey and Sussex.

Mr. Downes exhibited nymphs of *Anax imperator*, Leach (Paraneuroptera), and read the following note:—

“A FURTHER NOTE ON NYMPHS OF *ANAX IMPERATOR*, LEACH.—This

species is at present very common in one of the ponds in Richmond Park. Most of the nymphs are in one of two stages—small and nearly full grown—presumably 3 and 15 months old respectively—but there are a few intermediate in size. They apparently catch their food not by hunting it—although they can swim by shooting water out of the rectum at about 2 m.p.h. or more—but by waiting motionless on the muddy bottom of the pond until some animal comes up to them. They then of course shoot out the labium in the normal way to capture it. About 9 o'clock one night recently I went to this pond and found that they were so common that there were 27 of the large ones in a typical area of 3 square yards, together with many young ones. The large ones were all sitting about motionless in the way described.

“An interesting feature of this nymph is the extreme transparency of the cuticle. At any stage the pulsations of the rectum can be seen from the underside, and nearly always the ventral nerve cord is also visible (it is so in both the large ones shown to-night). I have also included a drawing of a small larva soon after moulting. In this was visible the brain with its tracheal supply; the tracheal trunks running right down to the rectum, and branching into the gills, most of the abdominal part of the gut and towards the back of the abdomen, part of the heart could be seen pulsating. I do not think that there are many insects of such a size in which so much of the internal anatomy is so easily visible.”

Mr. S. Wakely reported *Polygonia c-album*, L. from the Isle of Wight, and exhibited a bred series of *Perizoma bifaciata*, Haw. (*unifasciata*, Haw.), from Riddlesdown. The larvae fed on *Bartsia* and were all very dark suffused.

Mr. R. W. Attwood exhibited 1. *Herse convolvuli*, L., captured by Mr. Sellick at South Benfleet, Essex, on 17th September. (Another specimen was found dead a day or so later, floating on an ornamental fish pond at Thundersley, Essex, about a mile from where this was taken.)

2. *Perizoma (Emmelesia) bifaciata*, Haw. (*unifasciata*, Haw.). The larvae were taken by Mr. Wakely and himself on the 30th September, feeding on Red *Bartsia*. The insect seems to be overlooked as the larvae appear to occur wherever the food plant is found. Two larvae were even taken while gathering fresh food-plant from a piece of waste land in Sydenham.

3. *Calocampa vetusta*, Hb. The behaviour of these larvae while pupating is interesting. Six larvae all went down about the same

time. About two days later five of them had come to the surface again. They did not feed, however, but remained on the surface. The next day one had pupated, and the following day three others. In each case the pupae were quite clear of the cast larval skins which was not attached in any way to the cremaster.

Mr. E. E. Syms read a paper on "the Megaloptera (Snakeflies)" (See Trans.)

25th OCTOBER, 1934.

THE ANNUAL EXHIBITION AND CONVERSAZIONE.

The PRESIDENT, Mr. T. R. EAGLES, in the Chair.

Again more than 200 members, their friends, and visitors were welcomed by the Officers of the Society.

The Rev. E. B. Ashby exhibited:—1. An aberration of *Epinephele jurtina*, L. showing white scales on the upperside of the hindwings, captured near Locquignol, Forêt de Mormâle, N. France, 10th July last. 2. An *Apatura iris*, L. f. *iole*, Schiff. taken 20th June near Contrexéville, Vosges, France. 3. A pair of *Melitaea maturna*, L. from Contrexéville, 9th June.

Mr. Andrews exhibited the Dipteron, *Stomorhina lunata*, F., a migratory species taken at Bembridge, I. of Wight, 1.ix.34, of which the last British record was in 1901. Also the nest of a leaf-cutter bee, *Megachile* sp., from a decaying greenhouse roof at Eltham, Kent.

Mr. R. W. Attwood exhibited the following species obtained during the season of 1934:—*Herse convolvuli*, L., *Gastropacha quercifolia*, L., *Arctia villica*, L., *Saturnia pavonia*, L., *Cosmotriche potatoria*, L., *Lasiocampa (Bombyx) quercus*, L., *Limenitis camilla*, L. (*sibilla*, L.) and ab. *nigrina*, Weym., *Melitaea athalia*, Rott., *Thecla w-album*, Knh., *Selenia lunaria*, Schiff., *Ellopiia fasciaria*, L. (*prosa-piaria*, L.), *Discoloxa (Asthenes) blomeri*, Curt., *Odezia atrata*, L., *Euchloris smaragdaria*, Fb., *Chesias rufata*, Fb., *Demas coryli*, L., *Aporophyla lutulenta*, Bork., *Calocampa vetusta*, Hb.

Mr. L. C. Bushby exhibited living specimens of:—Crested Mantis, *Empusa egea*, Charp., S. France; Shore Earwig, *Labidura riparia*, Pall., S. France; Spined Stick Insect, *Cnipsus rhachis*, immature specimens, New Caledonia; Wolf Spider, *Trochosa cinerea*, Hungary; Peruvian Hunting Spider; Variegated Scorpion, *Opis-*

thophthalmus capensis; *Sinodendron cylindricum*, L., adults and larvae, Surrey.

Dr. K. G. Blair exhibited:—1. a box of captures at Field Meetings during 1934, including *Hydrochroa syringaria*, L., and *Calymnia* (*Caradrina*) *affinis*, L. (reared from larvae), and a pair of the fine Syrphid *Criorrhina ranunculi*, Pz., from Chilworth; *Strangalia nigra*, L., *Clytra quadripunctata*, L., *Cryptocephalus bipunctatus* var. *lineola*, F., and *Dryophilus pusillus*, Gyl. (Col.); *Lophyrus sertifer*, Geoffr., *Stromboceros delicatulus*, Fall. (Hym.); *Tipula gigantea*, Schr., *Theriopectes tropicus*, Mg., *Chrysops caecutiens*, L., *Dioctria oelandica*, L., and *Neoitamus cyanurus*, Lw. (Dipt.) from Broadwater Forest; *Nonagria geminipuncta*, Hatch., with its parasite *Aritranis carnifex*, Gr., the Chalcid *Smicra sispes*, L., parasite of *Stratiomys furcata*, F., *Nemotelus uliginosus*, L., *Ictericia westermanni*, Mg., *Ceroxys pictus*, Mg., and *Urophora stylata*, F. (Dipt.), and the local grasshopper *Metrioptera roeselii*, Hag., together with its macropterous form, from Benfleet; *Pterophorus carphodactyla*, Zett., bred from larvae found in flower-heads of *Inula conyza*, D.C.; the weevil *Smicromyx reichi*, Gyl., bred from seed heads of Centaury (*Erythraea centaureum*), and the grasshoppers *Meconema thalassina*, Deg., *Pholidoptera griseoptera*, Deg., and *Leptophyes punctatissima*, Bosc., from Eynsford.

2. Some ancient beetles from excavations in Egypt and Mesopotamia, together with modern specimens of the same species still existing in the respective localities.

3. A portfolio of drawings of beetle larvae by Miss B. Hopkins.

Mr. Percy Bright exhibited his series of *Polyommatus bellargus*, Rott. (*adonis*, Fb.) contained in eight cabinet drawers—comprising many unique and striking aberrations obtained by himself during a long series of years.

Mr. A. W. Buckstone exhibited the following series of aberrations of British Rhopalocera.

1. *Brenthis euphrosyne*, L., a series from Ashtead in May, with varied marking.

2. *Argynnis cydippe*, L. (*adippe*, L.), with dark ground and markings much emphasized, from Ashtead.

3. *Polygonia c-album*, L., specimens with a row of metallic spots on each hindwing, from Surrey and Sussex, and specimens with abnormally formed "comma" marks.

4. *Pararge aegeria*, L., with extreme pale and dark forms, Surrey and Sussex.

5. *Aphantopus hyperantus*, L., a specimen with somewhat lanceolate eyespots from Ashtead.

6. *Polyommatus icarus*, Rott., series of variable forms from the spring, summer and autumn broods.

7. *Polyommatus coridon*, Pod., specimens of underside aberration from Fetcham.

8. *Urbicula* (*Augiades*) *comma*, L., extreme dark and pale forms from the Surrey Hills.

9. *Nisoniades* (*Erynnis*) *tages*, L., dark and pale forms of both spring and summer broods.

Dr. G. V. Bull exhibited:—1. *Maniola tithonus*, L., and *Vanessa atalanta*, L., both showing marks of bird attacks. 2. Aberrations of *Brenthis euphrosyne*, L., and of *B. selene*, Schiff., showing dusting of black scales over the light ground. 3. A large race of *Euphydryas* (*Melitaea*) *aurinia*, Rott., bred from Dorset larvae. 4. An *Agrotis saucia*, Hb., taken freshly emerged on 17.iv.34. 5. A *Cucullia gnaphalii*, Hb., taken at light in Kent.

Mr. H. Charles exhibited a female of the Noctuid *Catephria alchymista*, Schiff., captured at Kingsdown near Deal, Kent, 12.viii.34.

Mr. G. A. Cole exhibited the Noctuid *Xylophasia zollikoferi*, Frr., taken on the South Coast this autumn.

Dr. E. A. Cockayne exhibited:—1. Specimens to show Melanism in the larvae of *Abraxas grossulariata*, L., and 2. Imagines and larvae of the Geometer *Ptychopoda laevigata*, Scop.

Mr. C. W. Colthrup exhibited an aberration of *Aglais* (*Vanessa*) *urticae*, L., taken with a jam jar and a postcard, in brilliant sunshine, on flower of buddleia, on 25.viii.34, at Chelmsford, Essex. The discal spots on forewing missing; the black markings on costal margin joined, with no lines of yellow marking, but a pale grey patch at the apex of each forewing.

Mr. R. C. R. Crewdson exhibited:—*Palimpsestis fluctuosa*, Hb., Sevenoaks, Kent., *Helotropha leucostigma*, Hb., Rannoch District, Perthshire; *Noctua castanea*, Esp., Rannoch District, Perthshire; *Catocala promissa*, Esp., South-east Sussex; *Pachnobia hyperborea*, Zett., Rannoch District, Perthshire; *Dianthoecia albimacula*, Bork., from Romney Marsh, Kent; *Poecilopsis* (*Nyssia*) *lapponaria*, Bdv., Perthshire; *Isturgia* (*Fidonia*) *carbonaria*, Clrck., Rannoch District, Perthshire.

Mr. A. W. Dennis exhibited a series of lantern slides on a frame, by transmitted light.

Mr. H. L. Dolton exhibited small series of *Mellinia gilvago*, Esp. ; *Ochria aurago*, Fb. ; *Zygaena trifolii*, Esp. (confluent forms) ; *Aricia medon*, Huf. (*astrarche*, Brgstr.) var. *salmacis*, St., from Durham.

Mr. T. R. Eagles exhibited several beautifully illustrated works of Moses Harris and Donovan, and also original drawings by Moses Harris, Sydenham, Edwards and Curtis.

Mr. S. W. Gadge, of the Surrey Honey Farm, exhibited a series of photographs illustrating the economy of the honey-bee hive and other subjects mainly of botanical interest.

Mr. L. A. C. Greenwood exhibited a heavily black-marked captured specimen of *Nymphalis io*, L. and a series of *Brithys crini*, Fb., bred in the spring of 1934 from larvae found in the autumn of 1933 at Kew Gardens, also including a second generation, bred in the autumn of 1934. This is an oriental species of which there is no previous record for the British Isles.

Mr. E. J. Hare exhibited :—(1.) 2 specimens of *Arctia caja*, L., from the Norfolk Broads district, (a) Inner spots of hindwings faintly indicated in yellow. (b) Ground colour of hindwings and abdomen yellow.

(2.) Short series of *Dianthoecia conspersa*, Schiff. (*nana*, Rott.) f. *hethlandica*, Stdgr., from Shetland.

Mr. C. N. Hawkins exhibited preserved Lepidopterous larvae showing seasonal and other variation.

Mr. S. B. Hodgson exhibited a series of forms of *Polyommatus icarus*, Rott., including a series of gynandromorphs taken in Co. Galway 1927-1932 ; ♀ Co. Galway, with asymmetrical blue scaling ; an English ♀ with rayed forewings ; with obsolete and striate underside forms.

Mr. Russell James exhibited :—1. Series of *Hyloicus pinastri*, L., bred ab. ovo from captured female, Dorset, 1933. Short series captured specimens for comparison, Dorset, 1934.

2. Series *Mellinea ocellaris*, Brk., captured Suffolk, 28th Sept., 1934 ; and four specimens *Leucania albipuncta*, Fb., Kent, 15th and 21st August, 1934.

Dr. Norman H. Joy exhibited a set of figures to be published in a book entitled "A Practical Pocket-book of British Birds."

Colonel S. H. Kenham exhibited a set of Melanic forms of Lepidoptera taken at Aspley Heath, Bedfordshire, pointing to connection between that place and Scotland, possibly attributable to the purchase of young trees—bearing ova—from Scotland in the past.

Dr. Harold King exhibited *Agrotis ripae*, Hb., from Dorset ;

Cosymbia (Ephyra) orbicularia, Hb., Dorset; *Selenia tetralunaria*, Hufn., Sussex; *Angerona prunaria*, L., Surrey; *Lophopteryx cuculla*, Esp., Bucks; *Boarmia ribeata*, Clrek. (*abietaria*, Schiff.), Bucks.

Colonel F. A. Labouchere exhibited a few Spanish *Lycaenidae*, *Hesperiidae* and *Satyridae*.

Mr. H. A. Leeds exhibited a bred *Ruralis betulae*, L., ♂, upperside hindwings strongly fulvous banded on lower half of border, instead of two spots. And 111 aberrations of 19 species, collected wild during 1934, the most notable being:—*Argynnis aglaia*, L., ♂, underside, red and black patches centre of inner margin to middle of left hindwing. *Pararge megera*, L., ♂ and ♀ uppersides, ocellated spot in fifth division forewings. *Coenonympha pamphilus*, L., ♂ underside with long, additional, piece of texture grown on surface right forewing. *Polyommatus medon*, Esp., undersides, ♂ all orange lunules well elongated on hindwings; and ♀ *caeca*, Courv. *Polyommatus coridon*, Pod., ♂ upperside, somewhat leaden ground; ♂ underside, devoid of all basal spots; ♀ upperside, blackish rough texture speckled with whitish. *Polyommatus icarus*, Rott., ♂ upperside, pale blue; ♂ underside, *radiata* (Courv.), plus elongation of most basal spots; ♀ undersides, *arcuata-bibasijuncta*, Tutt, *antico-discoelongata*, *anticoradiata*, Courv., and two with extremely long discoidal spot, right forewing on one and right hindwing the other. Also many examples of bleaching in this and other species.

Rev. J. N. Marcon exhibited the following Lepidoptera taken by himself during the 1934 season.

Melanic forms of *Dryas paphia*, Lin. ♂, Berkshire, and of *Polygonia c-album*, L. ♂ (*hutchinsoni*, Robs.), Worthing. Cream-coloured forms of *Brenthis euphrosyne*, L. ♀, Surrey, and *Coenonympha pamphilus*, L., Surrey. A striate *Polyommatus icarus*, Rott. ♂, S. Downs. An opal-coloured *P. icarus*, Rott. ♂, S. Downs. A symmetrically white marked *Maniola jurtina*, Lin. ♂, Berkshire. *Brenthis euphrosyne* with aberrant markings; *B. selene*, Schiff., ditto. *Pieris napi*, L., bred from Irish stock including three yellow forms, one with yellow apex. *Argynnis cydippe*, L. (*adippe*, L.), with aberrant markings, one with suffused hindwings. *A. aglaia*, L., one with spots on hindwings united, Berks. *Aglaia urticae*, L. ab. *polaris*, Stdgr., Berks. *P. icarus*, Rott., two with large ocelli, one with obsolete chevrons, S. Downs. *Rumicia phlaeas*, L., a suffused and a radiate form. *Melitaea cinxia*, L., with median band absent. *Polyommatus coridon*, Pod., an upperside ab. *fowleri*, South, and an underside ab. *digitata*, Courv. *Maniola tithonus*, L., with pale hind border.

And on behalf of Mr. P. Harris:—An underside *P. icarus* with forewings obsolete and hindwings striate. *R. phlaeas*, L., with band on hindwing obsolete. A gynandromorph *Plebeius aegon*, Schiff., = *argus*, L. *Aphantopus hyperantus*, L., one ab. *caeca* and one with hindwings only *caeca*.

Mr. Hugh Main numerous early stages of insect life in a living state.

Mr. A. M. Morley a picked series of aberrations of British Lepidoptera taken in S. Kent in 1934, including ;—

Coenonympha pamphilus, L., a specimen with wings of irregular shape and others variable in size and shape of eyespot. *Cupido minimus*, Fuess., ♂ with an unusual amount of blue scaling. *P. icarus*, Rott., ♀ ab. *clara*, Tutt., a ♀ practically obsolete underside with discoidals displaced. *Polyommatus bellargus*, Rott., ♂ ab. *nigra*, Ckll., and a ♀ darkened by use of carbolic acid in relaxing tin. *Hesperia malvae*, L., with underside unusually dark. *Psilura monacha*, L., light and dark forms. *Lophopteryx carmelita*, Esp. A short series of *Leucania albipuncta*, Fab. Both sexes of *Caradrina ambigua*, Fab. A varied series of *Metachrostis muralis*, Först. (*glandifera*, Hb.) *Acronicta megacephala*, Fb., a form with light patches on forewings. *Dianthoecia nana*, Rott., a second brood 24.viii.34. Dwarf forms of *Agrotis* (*Rhyacia*) *ypsilon*, Rott., 31mm., and of *Neuronia popularis*, Fb., 29mm. Two *Aventia flexula*, Schiff. Ab. *costimaculata*, Rbl. of *Xanthorhoë montanata*, Schiff. Light and dark forms of *Ectropis crepuscularia*, Hb. and ab. *delamerensis*, B. Wt., taken at the same time. Heavily marked forms of *Lithina chlorosata*, Scop. (*petraria*, Hb.) *Angerona prunaria*, L., a banded ♀ and ab. *pickettaria*, Prout, ♂ and the results of their crossing, 3 ♂ ♂ like parent, 2 ♀ ♀ of type form.

Mr. Moore exhibited a number of Exotic Cockroaches and Mantids.

Mr. Gifford Nash exhibited:—(1) A Tarantula spider found among Bananas by a Bedford greengrocer.

(2) Thorn apples on plant (*Datura stramonium*, L.) found in Bedford. Two underside vars. of *Melitaea cinxia*, L., taken in the I. of Wight in 1919 by Mr. Pugsley. A melanic var. of *Aphantopus hyperantus*, L., taken by Mr. H. Tebbs on 17th July, 1934, in the New Forest. One var. of *Polygonia c-album*, L., taken by Mr. A. West in Northants.

Mr. L. W. Newman exhibited:—1. Long series of *Polygonia c-album*, L., autumn brood, showing extreme dark and light forms,

also undersides almost intermediate between type and ab. *hutchinsoni*, Robs.

2. *Papilio machaon*, L. (Norfolk), a varied series; one with outer row of spots on the forewing on right hand side almost obsolete.

3. *Lasiocampa* (*Bombyx*) *quercus*, L., a very pale ♂.

4. *Eumorpha* (*Chaerocampa*) *elpenor*, L., a unique gynandromorph.

5. *Polyommatus* (*Lycaena*) *bellargus*, Rott. (*thetis*, Rott.), a ♀ smoky underside.

6. *Lycaenopsis argiolus*, L., 2nd brood ♀ ♀ very light and extreme dark forms.

Mr. M. Niblett exhibited the following gall-causers:—

Trypetidae.—*Orellia winthemi*, Mg., and parasites.

Cynipidae. Rare oak-gall causing species.—*Andricus xanthopsis*, Schlt., *Andricus amenti*, Gir., *Andricus circulans*, Mayr.

Mr. S. W. P. Pooles and Mr. F. W. Sharman exhibited a series of *Aegeria apiformis*, Clerk., and *Sphecia crabroniformis*, Lewin.

Mr. C. G. Priest exhibited British Lepidoptera from the Isle of Wight and other Districts.

Mr. S. G. Castle Russell exhibited British Rhopalocera taken or bred by himself in the season of 1934.

Dryas (*Argynnis*) *paphia*, L.—A female with spots on upper secondary wings coalesced. Two undersides of var. *valezina*, Esp., New Forest.

Brenthis euphrosyne, L.—A series of 16 aberrations including abnormally black marked uppersides, and two of a pale straw colour. North Hants and West Surrey.

Brenthis selene, Schiff.—A series of five specimens showing aberrational markings. N. Hants and W. Surrey.

Melitaea athalia, Rott.—A series of five, including a male with the upper wings entirely black except for marginal spotting. (var. *navarina*, Selys., L.), and a male with an abnormal amount of fulvous colouring. East Kent.

Aphantopus hyperanthus, Linn.—A specimen of ab. *lanceolata*, Shipp., and a very grey underside. N. Forest.

Maniola jurtina, L.—A series of 12 including bleached and asymmetrically spotted specimens. Winchester.

Euchloë cardamines, L.—A series of bred specimens with pale orange markings. A remarkable underside female with pale green and suffused markings, and a male with abnormal underside. Yorks and Winchester.

Aglais urticae, L.—A series of four aberrations including a fine example of ab. *ichnusa*, Bon. Winchester.

Hesperia malvae, L.—A dark underside. Winchester.

Rumicia (Chrysophanus) phlaeas, L.—An example of ab. *radiata*, Tutt, with only two faint red lines in place of red bar on underwings. Winchester.

Polyommatus bellargus, Rott.—A series of four including an ab. *obsoleta*, Tutt, form.

Polyommatus icarus, Rott.—Three specimens including a very blue female and a male underside having all four wings striated. N. Wilts.

Aricia medon, Hufn.—A specimen of form *obsoleta*, Tutt. Wilts.

Polyommatus coridon, Pod.—A series of 30 aberrational forms, upper and undersides, including a male and female ab. *cinnus*, Gerh., a female symmetrically dusted with blue scales on all wings. A short series of ab. *syngrapha*, Kef., including an example with unusually broad border and a specimen with a border of large wedge-like black spots lacking usual red spots.

Mr. S. G. Castle Russell, on behalf of Mr. A. H. Sperring of Southsea, exhibited an underside of *Brenthis euphrosyne*, L., showing colouring of a brick-red shade on all wings instead of the usual fulvous. Taken in South Hants, May, 1934.

On behalf of Mr. E. Rivenhall Goffe, of Kings Somborne, Hants, an aberration of *Aglais urticae*, L., taken by E. Rivenhall Goffe on Buddleia blossom in his garden at King's Somborne, 23rd Sept., 1934.

UPPERSIDE.—The three large black spots near the upper margins of the forewings are joined together forming a costal bar nearly $\frac{3}{4}$ " long and $\frac{1}{4}$ " wide. The outer areas of the primary wings are pale fulvous with borders of black stripes instead of the usual blue spots. The two small twin spots on the primaries are missing as in var. *ichnusa*. The marginal spots on the secondary wings are pale mauve on one side and normal blue on the other.

UNDERSIDE.—The primaries are more heavily suffused with black than usual and the red colouring of the upperside wings is clearly reproduced. A very remarkable and striking aberration.

On behalf of Mr. A. Russell, Caterham, Surrey, an aberration of *A. urticae*, L.—The three large black spots on the primary wings upperside are joined together and form a continuous bar. Taken near Aldershot, 10.ix.34.

Mr. A. G. B. Russell exhibited a selection of Moths taken in Co.

Dorset during the past year including a series of *Agrotis vestigialis*, Hufn., with some fine melanic and other varieties, a series of *Leucania albipuncta*, Fb. and some examples of *Catocala sponsa*, L. (rare in this county) and *Nonagria sparganii*, Esp. (believed to be new to the county).

Rev. J. E. Tarbat exhibited a very pale *Brenthis selene*, Schiff., and an *Aglais urticae*, L., ab. *unita-picata*.

Mr. S. Wakely exhibited a collection of 260 species of Lepidoptera taken during 1934. Including:—*Lithosia deplana*, Esp. and *L. sororcula*, Hufn.—Boxhill, Surrey; *L. varius chlorana*, L.—Isle of Wight; *Acosmetia caliginosa*, Hb.—Isle of Wight (bred); *Leucania (Aletia) albipuncta*, Fb.—Ashley Down, Isle of Wight; *Eupithecia denotata*, Hb.—Boxhill (bred from larvae); *Perizoma (Emmelesia) bifaciata*, Haw.—Riddlesdown, Surrey (bred from larvae); *Discoloxia (Euchoea) blomeri*, Curt.—Chalfont, Bucks.; *Minoa murinata*, Scop.—Selsdon, Surrey; *Odezia atrata*, L.—Groombridge, Kent; *Brenthis (Argynnis) euphrosyne*, L.—variety from New Forest, Hants (ground colour pale straw); *Polygonia c-album*, L.—Osborne, Isle of Wight (larvae found on elm); *Strymon (Thecla) pruni*, L., *Ruralis betulae*, L. and *S. quercus*, Linn.—larvae Monks Wood, Hunts.; *Strymon (Thecla) w-album*, Kn.—larvae from Maidenhead, Berks., and Surrey; *Trichiura crataegi*, L., and *Malacosoma neustria*, Linn.—Monks Wood, Hunts.; *M. castrensis*, Linn.—larvae Burnham-on-Crouch, Essex; *Adscita (Procris) statice*, Linn.—Groombridge, Kent; *Aphomia gularis*, Zell.—larvae taken by S. N. A. Jacobs in London warehouse; *Alucita spilodactyla*, Curt. and *Pterophorus carphodactyla*, Hb.—Isle of Wight; *Lozopera francillana*, Fb., *L. dilucidana*, Steph. and *Phalonia zephyrana*, Tr.—Riddlesdown, Surrey; *Phalonia affinitana*, Snell.—Burnham-on-Crouch, Essex; *P. vectisana*, Wstw.—Shalfleet, Isle of Wight; *Tortrix viburnana*, Fb.—including pale saltern form from Burnham-on-Crouch and South Benfleet, Essex; *Peronea literana*, L. and *Pammeme fimbriana*, Haw.—Ockham, Surrey; *Evetria turionana*, Hb. and *Roeslerstammia exalebella*, Fb.—Westerham, Kent; *Eucosma aemulana*, Schläg.—Shalfleet, Isle of Wight; *Polychrosis fuligana*, Hb.—Monks Wood, Hunts.; *Metzneria metzneriella*, Stt.—a very small specimen bred from seedheads of *Serratula tinctoria*, L. (Saw-wort), Parkhurst Forest, Isle of Wight; *Synanthedon flaviventris*, Stdgr.—Isle of Wight; *Coleophora lineolea*, Haw.—Larvae feeding on *Stachys lanata*, (Lambs Ear), Selsdon, Surrey.

Dr. C. G. M. de Worms exhibited:—

(1) A selection of British Lepidoptera taken during 1934 in-

cluding series of:—*Drymonia trimacula*, Esp. (New Forest); *Poly-ploca flavicornis*, L. (Scotland); *Agrotis ripae*, Hb. (East Kent); *Triphaena fimbria*, L. (bred); *Eurois prasina*, Fb. (Hants); *Xylomiges conspicillaris*, L. (Somerset); *Mamestra albicollis*, Hb. (East Kent); *Brachionycha nubeculosa*, Esp. (Aviemore); *Tapinostola extrema*, Hb. (Hunts); *Leucania turca*, L. (Hants); *Taeniocampa incerta*, Hufn. (Scotch); *Mellinia ocellaris*, Bork. (West Suffolk); *Agrophila trabealis*, Scop. (West Suffolk); *Calocalpe (Eucosmia) cervinalis*, Scop. (*certata*, Hb.) (Suffolk); *Coenoteaphria (Anticlea) berberata*, Schiff. (Suffolk); *Anagoga (Numeria) pulveraria*, L. (bred).

(2) A bred series of *Polygonia c-album*, L., from the New Forest.

(3) Varieties of *Polyommatus coridon*, Pod., taken in Sussex during 1934 including *obsoleta*, Tutt, *confluens*, Tutt, and *fowleri*, South.

(4) Varieties and Aberrations of British Lepidoptera taken in 1934, including *Limenitis camilla*, L., ab. *nigrina*, Weym., and ab. *seminigrina*, (Hants); a very melanic female of *Brenthis euphrosyne*, Lin. (New Forest), together with other dark forms of this species and of *Brenthis selene*, Schiff.; a heavily-banded form of *Xanthorhoe fluctuata*, L.; a melanic form of *Chiasmia clathrata*, L., taken in Hants; melanic examples of *Apocheima hispidaria*, Schiff.

8th NOVEMBER, 1934.

The PRESIDENT in the Chair.

Miss L. E. Cheesman, F.Z.S., gave a Lecture illustrated with Lantern Slides, "Among the Mountains of Papua."

22nd NOVEMBER, 1934.

The PRESIDENT in the Chair.

The following were elected members of the Society:—Mr. A. J. Musgrave, B.Sc., 21, Loveday Road, W.13; Mr. G. B. Oliver, Haslemere, High Wycombe; Mr. J. K. Ridfoot, Charterhouse, Godalming; Mr. G. P. Sutton, Kenilworth Gardens, Loughton, Essex; Mr. H. G. Tunstall, 11, St. James Avenue, Ewell.

Mr. Grant exhibited puff-ball fungi from Cobham with the Coleopteron *Lycoperdina boristae*, Fb.

Major H. L. Stevens gave an Address "Around the Empire on the track of Malaria," and illustrated his remarks with a series of films on the screen.

13th DECEMBER, 1934.

The PRESIDENT in the Chair.

New Members.—Mr. H. C. Gunton, of Gerrards Cross, Mr. H. V. Line, of Orpington, and Mr. T. Mears, of Wimbledon, were elected members.

Mr. R. Adkin presented his Report of the Annual Congress of the S. Eastern Union of Scientific Societies at Reading last July, which he had attended as the Society's Representative.

Dr. H. B. Williams exhibited *Ruralis* (*Thecla*) *betulae*, L., and the aberrations *subunicolor*, Tutt, *unicolor*, Tutt, *spinosae*, Gerh., *restricta-lineata*, Tutt, *lata*, Tutt, and a ♀ form in which the orange lunules on the hindwings are confluent, Sussex, 1934. Also *Hipparchia semele*, L., from S. Hants, 1934, including ♂ forms with lower spot obsolescent on the underside.

Mr. Grant exhibited specimens of the large water beetle *Hydrophilus piceus*, L.

Mr. Robert Adkin exhibited the following rare species of Heterocera taken in his garden at Eastbourne, at light, during the past summer, viz., *Roeselia* (*Nola*) *centonalis*, Hüb., of which the most recent records were from Folkstone and Hastings about forty years ago and Woodbridge in Suffolk in 1904. *Caradrina ambigua*, Fab., which although first recorded as British from specimens taken in Sussex in 1879 had seldom been taken in that county for many years past; and *Leucania albipuncta*, Fab. He also exhibited two specimens of *Gracillaria azaleella*, Brants., which were taken on the 4th August and read the following note:—"This species was first noticed in Britain as a pest on Azaleas in a greenhouse at Torquay, in 1925 (*Entom.*, 1926 p. 13), then, under similar circumstances, at Salisbury in 1930 (*Ent. Rec.* 1930, p. 45); and now we find it at Eastbourne: evidently it is extending its range in this country and may possibly become a serious pest."

Mr. Adkin also exhibited four species bred during 1934 from leaves collected from apple trees growing in his garden at Eastbourne in the autumn of 1933, viz., *Lithocolletis corylifoliella*, Haw., *L. concomitella*, Banks, *L. blancardella*, Fab., and *Nepticula pomella*, Vaughan, also leaves showing the peculiar mines containing larvae of *L. corylifoliella*. With regard to this species, he said that it was one of the few *Lithocolletids* that remained in the larval state during the winter, not pupating until spring; it was therefore

necessary, in order to rear it successfully, to keep the leaves containing the larvae moist throughout the winter and early spring.

Also three specimens of *Laspeyresia* (*Carpocapsa*) *pomonella*, L., bred in July, 1934, from larvae taken in August, 1932 (Proc. 1933-4, p. 38). The cocoons from which these were reared had been examined in October 1933 and were found then still to contain larvae; it was, therefore, evident that the larvae had remained, as such, in the cocoons throughout the whole of 1933, and had not pupated until the spring of the second year.

Mr. Robert Adkin then read a paper on "Some Lost Suburban Hunting Grounds" (See Trans.) and in illustration of his remarks exhibited the following species:—Lewisham district.—*Comacia* (*Mitochrista*) *senex*, Hüb., *Acrionicta leporina*, L., *Agrotis ypsilon*, Rott. (*suffusa*, Hüb.), *Omphaloscelis* (*Anchocelis*) *lunosa*, Haw., *Lithophane* (*Xylina*) *semibrunnea*, Haw., *Hepialus humuli*, L., *Pandemis* (*Tortrix*) *corylana*, Fab. Greenwich Marshes.—*Agrotis nigricans*, L., *Ochria ochracea*, Hüb. (*flavago*, Esp.), *Calamia phragmitidis*, Hüb., *Leucania straminea*, Treits. West Wickham and Shirley.—*Drepana falcataria*, L., *Agrotis strigula*, Thunbg. (*porphyrea*, Hüb.), *A. agathina*, Dup., *Noctua castanea*, Esp., *N. dahlia*, Hüb., *Xanthia fulvago*, L., *X. lutea*, Strom. (*flavago*, Fab.), *Thera obeliscata*, Hüb., *Cleora lichenaria*, Hufn., *Dyscia* (*Scodiona*) *fagaria*, Thunbg. (*belgiana*, Bkh.), *Perconia* (*Aspitates*) *strigillaria*, Hüb. Darent.—*Aporophylla lutulenta*, Bkh., *Cirrhoedia xerampelina*, Hüb.

All of these were at least half a century old, many of them considerably older.

South Eastern Union of Scientific Societies.

39th ANNUAL CONGRESS.

READING, 11TH TO 14TH JULY, 1934.

REPORT OF THE SOCIETY'S REPRESENTATIVES.

It will be noticed that the date of the 1934 Congress was fully a month later than usual, the reason being that it was desirable that it should not clash with term time of the University, an arrangement that proved eminently satisfactory as it enabled the greater part of the University buildings to be placed at the disposal of the Congress, thus giving ample accommodation for the reception of the members attending, for meetings of the various sections to be

held simultaneously, and for the issuing of tickets for excursions and so forth.

The Union was fortunate on this occasion in having for its President Professor H. Leader Hawkins, D.Sc., F.G.S., Professor of Geology at the University of Reading, and it may be said without hesitation that the success of the Congress was due to his untiring efforts. He not only took a leading share in the arranging and the carrying through of the programme, but was indefatigable in his care and attention for the comfort of the members, and in all this he was ably assisted by the Local Hon. Secretary, Mr. W. C. Fishlock, and the members who attended will we are sure, one and all, wish to express their gratitude to these gentlemen.

The members began to assemble soon after 11 o'clock on the Wednesday morning in the Gymnasium of the University which had been fitted up as a reception room with writing tables, chairs and all desirable conveniences. Members, who so desired, were accommodated in the Halls of Residence of the University during their stay, and luncheon was obtainable daily in the Buttery within the grounds. Indeed, the arrangements for our comfort were as near perfect as might be.

Wednesday afternoon was devoted to a tour of the more interesting places of the town; the Abbey ruins, where a descriptive talk was given by H. T. Morley, J.P., F.S.A., F.R.Hist. Soc.; the gardens, the exterior of churches, and the Municipal Museum, where notes on some of the more important exhibits were given and proved particularly interesting.

In the evening the members were received by the Council and Senate of the University in the Hall of the University at 8 o'clock; at 8.30 the new President was inducted and delivered his Presidential Address. He took as his title "Fossils and Man," a subject which enabled him to unfold a particularly interesting and enlightening story on evolution. The evening was brought to a close with a conversazione.

On Thursday morning at 9.30 the Representatives held their first meeting. The Council's report, the Hon. Treasurer's accounts and report, and the reports of some of the sections were read and adopted; the President, Officers and Council for the ensuing year were elected; and other formal business having been transacted the meeting was adjourned to Saturday; when the remainder of the sectional reports were presented, sundry votes of thanks passed, and an invitation for the Union to hold its 1935

Congress at Bournemouth accepted. A suggestion was brought forward that the Congress should in future be extended by an extra day, that is that it should assemble on Tuesday and extend over the remainder of the week. Representatives were asked to confer with their respective Societies and to report their views at the Congress in 1935.

The remainder of Thursday morning was devoted to the meetings of the Archaeological and Botanical Sections. In the former the President, T. D. Kendrick, M.A., F.S.A., gave an Address on "The Art and Archaeology of the early Anglo-Saxons," and this was followed by a paper by P. S. Spokes, M.A., B.Sc., on "Some Aspects of Local Heraldry." In the Botanical Section the President, Macgregor Skene, D.Sc. (of Bristol University), spoke on "Some Problems of Germination," in which he referred to the great differences in the time that various species of seeds retained their vitality, and among other things the impossibility of the so called mummy wheat germinating after being kept for some thousands of years. Mr. Somerville Hastings, M.B., B.S., F.R.C.S., gave a lantern lecture on "Plant Life in Alpine Switzerland," a subject which drew a large audience.

For Thursday afternoon four excursions were arranged. The Archaeologists visited Silchester. Unfortunately the greater part of the excavations had been filled in, and as the President remarked, a good deal more of Silchester was to be seen in the museum than on the spot; however, a visit to the site was interesting and was rendered the more so by the remarks of Lt.-Col. Karlake, F.S.A., who had charge of the party.

The Botanists explored the Valley of the Kennett and Greenham Common under the guidance of Miss M. A. Corry, and those interested in Regional Survey visited the University Agricultural and Horticultural Farms and the National Institute for Research in Dairying at Shinfield.

The Geologists journeyed to Kingsclere, that remarkable spot where the North and South Downs and the Chilterns seem all to meet and to enclose within a few hundred yards most of the geological formations associated with the chalk. In several places exposed sections permitted remarkably good views of the strata to be seen. At each of these a halt was made, and, despite a gentle rain that was falling, our enthusiastic President, who had taken the party under his wing, gave most interesting notes upon the various structures. Chalk fossils were to be found in numbers and several

members availed themselves of the opportunity to secure such samples as the time available permitted. If the country around Kingsclere is a veritable geological paradise, there is little doubt that it would be equally interesting to the botanist and the entomologist, but unfortunately the dampness of the herbage and the very limited time at the disposal of the party rendered any detailed investigation impossible.

In the evening The Right Worshipful the Mayor, Alderman Miss Edith M. Sutton, J.P., entertained the members to a Reception at the Town Hall when a most pleasant evening was spent. The museum adjoining was specially thrown open to the visitors, and the Mayor's personal solicitude for their enjoyment was most cordial.

On Friday, there being no Representatives' Meeting, the whole of the morning was devoted to Sectional Meetings, and having disposed of their routine business—Reports, election of Presidents and Officers for the ensuing year and so forth—they settled down to Presidents' Addresses and Papers.

In the Zoological Section the President, C. B. Williams, D.Sc., F.R.E.S., Entomologist to the Rothamsted Experimental Station, gave an Address on "Insect Immigration in Great Britain"; and this was followed by a Paper on "The Vertebrate Fauna during the Period of Man," by W. A. Smallcombe, B.Sc.

The Presidential Address to the Geological Section, by F. H. Edmunds, M.A., F.G.S., dealt with "The Water Supply and Geology of the South East of England"; and was followed by a Paper by Llewellyn Treacher on "The Gravels of the District."

The Regional Survey Section had a very full morning's work. The President, C. H. Grinling, B.A., addressed them on "Survey for Action"; then followed a Paper by E. W. Gilbert, B.Litt., M.A., F.R.G.S., on "Reading, its Position and Growth," and another by W. A. Seaby on "The Distribution of pre-historic and early historic Man in the Middle Thames Basin."

A number of excursions were arranged for the afternoon and despite a heavy thunderstorm that broke about 1 o'clock and was followed by frequent showers, most of them were carried through in circumstances less pleasant than might have otherwise have been the case. The Geologists visited Theale and Pangbourne, again under the guidance of Prof. Hawkins. The Zoologists and Botanists journeyed to the renowned Pamber Forest, conducted by R. E. G. Smith and L. Rudland, and were perhaps the greatest

sufferers from the weather for with wringing wet foliage work in either department is, to say the least, not pleasant. It may, however, not be out of place to mention here that the Purple Emperor Butterfly (*Apatura iris*, L.), an old inhabitant of the Forest, but which had apparently deserted it for many years, had again turned up, but of course was not seen on this occasion. Visits were also paid to Messrs. Sutton and Sons' Seed Trial Grounds, Huntley and Palmer's Biscuit Factory, and other interesting works in and around the town, competent guides explaining the various processes at each.

In the evening Prof. E. B. Poulton, F.R.S., gave a Public Lecture to a large audience in the Town Hall on "The Power of Changing Colour as a form of Protective Resemblance."

On Saturday morning, after the adjourned Representatives' Meeting, Sir Lawrence Chubb gave an Address on "The Rights of Way Act, 1932," an important enactment to all lovers of the countryside as it gives the means of defining what are and what are not Public Rights of Way. At noon a large company assembled for a long excursion to the Vale of the White Horse, Uffington Castle, Wayland Smith's Cave, and Blewburton, when a very pleasant and interesting long afternoon was spent, and on its return the Congress automatically came to a close.

The Congress in 1935 has been arranged to be held in Bournemouth from 26th to 29th June under the Presidency of Prof. A. C. Seward.

ROBERT ADKIN } Representatives.
G. V. BULL }

10th JANUARY, 1935.

The PRESIDENT in the Chair.

The decease of a member, Mr. G. Routledge, was reported.

Mr. J. A. Stephen, of Chatham, and Prof H. B. Whitehouse, of Birmingham, were elected members.

Mr. M. Niblett, Mr. H. W. Andrews, and the President exhibited series and examples of *Trypetidae* (Dip.) to illustrate the Paper subsequently read by Mr. Niblett.

Dr. Cockayne exhibited a larva of *Leucania albipuncta*, Fb., from ova laid by a female taken at Swanage, September, 1934, and said that some larvae have a red-brown ground colour, others a pure

grey one, but the black markings in all are very clear and strong, as in the most clearly marked larvae of *L. lithargyria*, Esp.

Mr. Wakely exhibited series of the several species of the genus *Tinea* and read the following notes:—

“An article has been published recently, written by Messrs. F. N. Pierce and J. W. Metcalfe, dealing with the species shown to-night, namely, *Tinea cloacella*, Haw., *T. granella*, Linn., *T. ruricolella*, Staint., and the newly discovered *T. personella*, P. & M. sp. nov. Mr. Pierce has kindly identified these four species for me, and I find that, although the general look of each species when placed in series side by side with the others is quite distinctive, yet it is still by no means easy to identify all specimens by markings and colour. Each species, however, can be identified by an examination of the genitalia.

“The splendid series of *Tinea personella* were taken by Mr. F. J. Coulson at Clissold Park, North London, and were found on tree trunks, the empty pupa cases being also noticed protruding from the bark. A single specimen was also taken by him at Horsley, Surrey.

“The two specimens of *Tinea ruricolella* were bred out of fungus taken on Wimbledon Common by Mr. Coulson and passed on to me.

“*Tinea granella* has also been recorded from fungus. Personally I have bred it from bitter almonds, dried figs and printers old ink-rollers; but Mr. Jacobs once gave me some larvae feeding on ergot of rye and peanuts.

“*Tinea cloacella* has been bred in numbers from old fungus and is the commonest of the four species mentioned.

“Mr. Coulson’s series of *T. personella* are especially noteworthy and have added another locality to the known range of this species.”

In addition Mr. Wakely read the following note on his summer holiday observations. “Last August, during a holiday in the Isle of Wight, I noticed some flower-heads of thistles (*Carduus nutans*, L. and *Cirsium lanceolatum*, L.) evidently suffering from the attacks of some insect. A closer inspection disclosed several lepidopterous larvae, so I took a sample which I kept in a linen bag, hoping eventually to breed the moth and determine the species. Within a few weeks I found a number of the larvae had eaten their way through the bag and had escaped. However, I recognised some of these in the act of escaping, as a common species—*Myelophila* (*Myelois*) *cribrella*, Hb. The thistle-heads were examined again at the end of November, and several small lepidopterous larvae detected, which I hope to breed through next spring. At the same time a specimen of the beetle exhibited, *Rhinocyllus conicus*, Froel, was

found. It was enclosed in a burnt-looking black gall situated under the seeds, and several others were found later within similar gall-like growths.

Mr. B. T. MacNulty exhibited specimens of a 3rd brood of *Phragmatobia fuliginosa*, L. Ova were laid 15th August and the larvae pupated by the end of September. One larva failed to pupate and died. From the eleven pupa obtained, six moths emerged, one of which was deformed. The first on 25th October and the last on the 19th of November. The larvae were kept on a window sill. No attempt was made to force them.

Mr. M. Niblett read a Paper entitled "Some Observations on British *Trypetidae*." (See Trans.)

24th JANUARY, 1935.

ANNUAL MEETING.

The PRESIDENT, Mr. T. R. EAGLES, in the Chair.

The Report of the Treasurer, the Financial Statement, the Balance Sheet and the Council's Report for the past twelve months were presented, read and approved.

The following is the List of Officers and Council who were declared elected for the year 1935-6.

President.—E. E. Syms, F.R.E.S. *Vice-Presidents*.—T. R. Eagles, M. Niblett. *Hon. Treasurer*.—A. E. Tonge, F.R.E.S. *Hon. Librarian*.—E. E. Syms, F.R.E.S. *Hon. Editor*.—Hy. J. Turner, F.R.E.S., F.R.H.S. *Hon. Secretaries*.—S. N. A. Jacobs, Hy. J. Turner. *Hon. Lanternist*.—J. H. Adkin. *Council*.—R. W. Attwood, F. J. Coulson, H. G. Denvil, P. Bainbrigg Fletcher, M.Sc., F.R.E.S., J. A. Downes, C. G. M. de Worms, M.A., F.C.S., F.R.E.S., F. Stanley-Smith, Mrs. M. Stanley-Smith, G. V. Bull, B.A., M.B., H. King, D.Sc., F.R.S.

The President then read his Address and the New President took the Chair.

Votes of Thanks to the retiring President, Officers, Council and Auditors for their services during the past year were proposed and passed.

ORDINARY MEETING.

Mr. E. E. SYMS, PRESIDENT, in the Chair.

The death of an Hon. Member, Dr. F. A. Dixey, M.A., F.R.S., was announced.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read 24th January, 1935.

By T. R. EAGLES, *President.*

LADIES and GENTLEMEN. The reports you have just heard read are evidence of the sound and happy position of the Society. The total membership is 245—a slight decrease, it is true, compared with last year, but the falling off is apparent only, being due to a drastic weeding of the list.

The Meetings, both in these Rooms and in the Field, have been well attended. The exhibits have been varied and instructive. The Society's collections and books are in good state and are of real value for reference purposes. Lastly, but not least, the finances are in sound order. All these things we owe to the efforts of the various working officers and to the happy spirit of co-operation shown by all members.

I suppose we shall always have certain little problems to contend with and I want to take this opportunity of referring to some of them so that the improvement which has been shown lately may be maintained. Every care should be taken to ensure that exhibits are passed round so that all members may see them. When we recollect that the preparation of even a small exhibit entails time, trouble and risk, this little effort is clearly due.

There is on the official card a request to exhibitors to furnish written particulars to the Secretary. It is also very desirable that the exhibit itself should have some quite brief particulars with it, so that a member examining an exhibit may not be wholly dependent on his recollection of what was said by the exhibitor. Again those little arts and devices which make the exhibits more clearly visible should be employed and developed. Lastly, there is sometimes a certain diffidence among members in answering the queries put by

exhibitors, who now and again desire further information about their exhibits. I mention these matters partly for the sake of new members, as we look forward to seeing exhibits from them during the coming year.

Turning from our own domestic affairs for a moment I wish to record with what feelings of gratitude and pride we learned of the well-earned honour of Knighthood conferred by His Majesty the King on one of the leading Entomologists of our day—Professor Poulton. In this pride and gratitude I am sure all who are devoted to Natural History will humbly join.

Ladies and Gentlemen, during the year we have lost three members by death—Mrs. Brooke, who specialized in horticultural entomology; Mr. George Bell Routledge, F.R.E.S., of Carlisle, who was the author of “The Lepidoptera of Cumberland”; and Dr. F. A. Dixey, F.R.S., F.R.E.S., formerly sub-warden, bursar, and lecturer, and honorary fellow of Wadham College, Oxford. A few days ago Dr. Dixey lost his life in a street accident in London. In November, 1928, he addressed us here on the “Scent Glands of the Pierinae.” He had contributed greatly to our knowledge of this subject and of Mimicry. He was a Honorary Member.

I propose to-night to review some of the biological theories which are accepted to-day as having validity and to consider them in relation to our own activities in Entomology and Natural History. Some of these theories are very generally accepted; others are not so fortunate.

I confine myself to those accepted to-day because it would take too long to consider the others, and moreover it would be of no practical value. It must not be forgotten, that in the past certain biological theories have held the field for long periods and then have been superseded and forgotten. Without dwelling on this fact, I wish nevertheless to emphasize it because it is valuable as a reminder that the theories, we to-day hold in such high regard, may be smiled at by posterity.

I shall speak about Mendelism, Mimicry, and Colour Conflict.

1. Mendelism has attracted the attention of a wide public, because, apart from the commercial interest of those concerned in animal or plant breeding, there are many who are keenly interested in problems of heredity from a political, cultural, or purely persona

standpoint. Thus the elementary principles of Mendelian inheritance are known—a little vaguely perhaps—to a substantial percentage of educated people. The working entomologist, more especially the rearer of lepidopterous larvae, can hardly avoid knowing a good deal about Mendelism, and, if he is to derive from his work full value for himself and others, he should have its main rules at his finger tips so that he may be instant to see the experimental possibilities of, for example, the curious and unusual specimen of a common insect, which he finds one day on a fence or in his emerging cage. Then perhaps his thoughts will not automatically fly to the killing bottle, the setting board, and the cabinet. Instead he may be emboldened to take the risk of rearing from this specimen. The result may be failure and total loss. On the other hand successful rearing may yield, not only a number of welcome specimens for the cabinet, but also valuable information on the genetics of the insect.

It may be objected that there has been so much elaborate work on Mendelian lines with insects—to say nothing of what has been done with plants and animals—that without prolonged work of the type demanding a laboratory or an insectary, nothing useful can be done. I think this is a false view. Let us consider the most obvious thing—the ascertainment of whether a particular feature, is or is not, inherited on Mendelian lines. An accumulation of a large number of experimentally ascertained facts on this point will be, I suggest, of great value in helping to clear up the most important question of the true boundary line. To get the proper perspective of this matter it is necessary to bear in mind that there is, to put it at its lowest, the possibility that all organic inheritance is on Mendelian lines. It may not be so much a question of finding what characters are inherited on Mendelian lines, as of finding which are not. Merely because environment suggests itself as a ready explanation we must not jump to the conclusion that Mendelian inheritance is not to be expected. The factor which produces a certain outward and visible character in one external environment may produce quite another, if the external environment (temperature and the like) is altered. Naturally it will exhibit Mendelian features equally in both circumstances. Thus the exceptional character, which excites our curiosity as being new, may be nothing more than an old friend in disguise. More subtly the effect of a factor may be altered by internal environment so that a factor, which produces in the ordinary way a certain character, may in the case of a particular individual produce

some different character. This kind of alteration is thought to be due to an alteration in the arrangement of the other factors or genes in the various chromosomes, to a change in what is sometimes referred to as the gene complex. There would be no external visible indication of the existence of such a change in the environment of the factor, and so an old friend might in this instance be even more effectively disguised. All of which goes to prove that breeding is the only way of being sure of the proper view to take of any unusual form coming under our notice.

If we come to the conclusion that a character is not Mendelian, we should pause to consider to what type it may be presumed to belong, for example, is it induced by a general environmental cause such as industrial pollution or by special causes such as starvation, poisoning, or accidental staining of the tissues. We shall note how soon it wears off—does it disappear in the first filial generation or does it, though diminished, persist to the second?

Presuming the character is proved to be one that passes from generation to generation on Mendelian lines, various other questions suggest themselves. The answers to these will reveal, more or less completely, what special inheritance properties the character concerned possesses. The first point is probably to observe what character behaves as the opposite or contrasted character of the particular character we are considering. This is generally to be inferred from the nature of the character itself, as for example normal colouring to albinism. But every case is not so simple. After all we are studying organisms whose economy is vastly different from our own. Clearly if we start off with a wrong assumption as to what characters are allelomorphic we shall soon have to retrace our steps and begin again.

Next comes the question of dominance. If we wish to obtain a long series of specimens exhibiting a feature which we have recognised as Mendelian we shall need to ascertain as early as possible whether what we are dealing with is dominant or recessive. It is familiar to us all that as long as we are dealing with two recessive individuals as parents breeding is almost invariably true. This, of course, arises out of the very nature of a recessive because any individual that exhibits the recessive character must be devoid of any factor for the opposite dominant character. Were the dominant character present it would necessarily assert itself so that the recessive factor would be completely masked. As soon, however, as a dominant is introduced as one present in a

breeding experiment various results may follow according to the precise circumstances. The results are often as irritating as they are informative, but these troubles have to be faced as part of the task of the breeder, whether he be working for collecting or for experimenting purposes. The wild stocks with which our breeding experiments commence have almost always various dominant factors, and may be either homozygous carrying two dominant factors or heterozygous carrying a dominant factor and a recessive. The two cases will be outwardly similar and it is only by breeding that the two kinds can be sorted out.

Linkage is the next feature to attract our attention. Presumably because the genes for two characters reside in the same chromosome such characters are normally found together. Or it may be that, supposedly because a particular character is in association with the sex-chromosome, such character is inherited relative to sex. Information on these points is valuable to the collecting breeder because recessive sex linked characters are often much commoner in one sex than in another. Hence special back-crossing may be necessary to secure them in the sex in which they occur less freely. From a scientific point of view the results are valuable. True, it cannot be hoped to work out the hereditary features and chromosome make-up of more than a very few insects in the same detail as has been done with the fruit fly, *Drosophila melanogaster*. That insect has only four chromosomes—an exceptionally small number. Fourteen and upwards are usual with lepidoptera. Nevertheless, the accumulation of observations will be valuable and it may lead to useful generalizations more quickly than at first seems possible.

There are several other Mendelian features, but there is not time to deal with these. Alongside the various queries that can be classified as purely Mendelian there is the problem of the inheritance of acquired characteristics. We all know that by usage of environment certain characters are acquired. It is familiar that among human beings, for example, the constant demands made on certain limbs and muscles by the work peculiar to different crafts bring about abnormal developments which can be noticed in life and which can be detected sometimes even in the skeleton. It is equally familiar that in general these acquired characteristics are not inherited. Various experiments have been made with a view to discovering whether any inheritance or partial inheritance of acquired characteristics can be traced. These experiments have on the whole been inconclusive and in one well known case the bona

fides of the experiment have been called in question. Animals have been trained to do certain things and their descendants have been watched to see if they learnt more easily. But factors such as the gradual taming of the animals tend to vitiate such experiments. Moreover, these experiments are concerned with actions rather than structure. It may ultimately prove that the structural acquired characters are inherited to a degree so minute that the inheritance has been overlooked. If this be so it will probably not be in organisms so small as insects that the process will first be detected. However that may be the matter is worth watching because of its obvious importance in connection with evolution.

2. I have said that Entomologists have made a large contribution to the total store of knowledge of Mendelism. When I turn to Mimicry I am tempted to say that they have made the chief contribution. Certainly the subject has been studied by many prominent entomologists with the utmost care, enthusiasm, and success. Immediately the subject is approached a confusion of names is encountered, but this should not dismay anyone interested in Natural History. Here, however, it is not the more usual case of several names being applied to the same thing. It is the reverse, for several things are often lumped under the same name owing to failure to use the distinctive terms propounded by the Entomologists already referred to. Yet the use of the proper titles is most helpful to fix in the mind ideas which the working naturalist should always have before him ready for application to observed facts. The simplest of these ideas is that of mere concealing resemblance. No one who does any Natural History work in the field is ever likely to lose sight of the wonderful efficiency of the procryptic devices of insects, whether it be general procrypsis which is the resemblance to the whole environment, or special procrypsis which is the resemblance to some special item such as a seed or a feather. Yet the most fascinating aspects of mimicry are not the resemblance of insects to their inanimate surroundings but their resemblance to each other. It is pleasing to recall that our countryman Bates was one of the first, if not the first, to deal with this form of mimicry. So much so that his name is used to describe the case where an insect not itself distasteful to birds, lizards, etc., secures protection by an outward resemblance to other insects which are distasteful or which are better left alone because of the possession of a weapon such as a sting, or irritating hairs, or an unpleasant exudation, or which are undesirable because of

exceptional toughness. Further observations and investigations followed on the suggestions made by Bates and led another worker, this time a German, to draw attention to another form of mimicry. This mimicry, to which has been given the name Mullerian, occurs where an insect, itself distasteful to enemies resembles another which is also distasteful. The selective cause producing the two things is, however, quite similar, being merely the attacks of hungry enemies. In the first case there would be a tendency for a form of an edible insect which slightly resembled a distasteful one to have an advantage over another form. It might not secure immunity from attack, but nevertheless the lessening of the danger might easily be appreciable. It may well be that if a resemblance is only sufficient to cause a second's hesitation on the part of the attacker it may yet be enough to secure the escape of the mimic. In the second case, which is that of Mullerian mimicry, one of the selective agents is thought to be the attacks of young birds learning by experience to avoid insects of a certain pattern. If two or more different species have the same pattern then the loss arising in the cause of education of young birds would tend to be divided over all the species having the pattern instead of being borne by one only. It will be readily appreciated that these two kinds of mimicry working together will bring about large associations of similar insects all flying the same flag—some being genuine members of the association in that they are distasteful—others more or less impostors falsely carrying the label of inedibility and being what is technically called pseudaposematic. Until it reached the point of balance at which its very size defeated its purpose such an association would grow by, as it were, drawing to itself other species, particularly those numerically weaker.

While the field Naturalist in these islands has ample opportunities of studying procrypsis and can never cease to marvel at the close resemblance of larvae and insects to inanimate objects, he has not nearly so much first hand acquaintance with the other forms of mimicry. This is reflected in the writings on Batesian and Mullerian mimicry where most of the examples dealt with are exotic insects. The pioneer observations too seem to have been made overseas. Nevertheless there are in our fauna instances and indications of these forms of mimicry. Though there are some among the lepidoptera there are more among the other orders of insects. The best known instance among our lepidoptera is, I suppose, that of the clearwing moths. Even here the models are members of another

order of insects. Most of us have heard the story of the entomologist who explained to his friend the protection gained by a hornet clear-wing moth from its resemblance to a wasp. To his dismay a sparrow swooped down and devoured the moth. This may be explained on the footing that the clearwings are Batesian mimics and therefore really edible, and that a sparrow, especially a town sparrow, would be too sophisticated to be deceived. A more serious reason for thinking the clearwings are Batesian mimics is that they are so much less common than their models. This would be expected for the reason that a too abundant Batesian mimic would endanger the effectiveness of the warning pattern of the model. Predaceous enemies would come to regard a trial as worth while. This would be almost as disastrous to the model that would be rejected as to the mimic that would be eaten.

To the general observer of nature in these islands, the best known example of mimicry is that of certain flies to wasps and bees. It seems to follow that this is Batesian mimicry because the protection of the wasps and bees is not distastefulness but their stings. The mimics lack the stings so that their bee and wasp make-up is pseudaposematic. It should be remembered that the protection secured by the flies is against birds and not against the bees and wasps which they resemble. It was suggested that certain of these flies needed the protection of a bee-like appearance because they entered bees' nests as enemies. It seems, however, that they are not enemies of the bee community but rather friends who do scavenging work. In any case it is doubtful if these hymenoptera take note of the general appearance of another insect. It is more likely they are guided by scent. Fairly obvious examples of members of the well known associations of warningly coloured insects are to be found in this country, though perhaps the full significance of the colours and behaviour would not have been so readily appreciated were it not for the knowledge gained by the study of more numerous and more striking examples overseas. *Taeniocampa miniosa* whose larvae live in colonies on scrub oak in certain localities is an instance which brings to mind some characteristics wide spread among warningly coloured insects. First there is the fact that they congregate together, thus enhancing the effect of the warning colours. The second feature is the wide difference between this larva and those of the other members of the genus found in this country. These others are concealingly coloured—mostly got up to resemble foliage, but in one instance (*munda*) the resemblance is to a twig.

Taeniocampa miniosa has, so to speak, abandoned the uniform of its fellows and put on that of the group of which it has become a member. Apparently here, as in most other cases, a price has to be paid for advantages, for this species is, I think, more heavily parasitized than any of the others. Another character of insects belonging to mimetic associations is that they are often sluggish. They rely on their warning colours and make no effort to escape. Thus at times one sees the large "frog-hopper," *Triecphora vulnerata*, warningly coloured red and black, resting conspicuously on tall grasses and other herbage. In the same way a colony of the large red beetle, *Chrysolena* (*Chrysomela*) *populi* may be seen, the individuals blatantly obvious on the plants of dwarf willow.

These insects, as I have said, belong to mimetic associations. Whether they are models, or Batesian mimics, or Mullerian mimics is difficult to ascertain or even infer in a country with a fauna so comparatively sparse as ours. Probably in other parts of their range their position in the scheme of things would be apparent.

Another hindrance to the study of mimetic problems in our own country is the small size of these islands. The most fascinating feature of mimicry and the most arresting argument in favour of its reality is the way models which vary in different parts of large land areas are followed by correspondingly varying mimics.

It is natural to enquire to what extent the facts and theories of mimicry can be explained by or reconciled with the inheritance theories passing under the name of Mendelism. There is not time to do more than to refer to one or two facts. In the first place investigations have been made with some of the exotic species of butterflies which have varying forms to mimic different models. It has been shown that certain of the different forms segregate in Mendelian ratios and it seems altogether probable that the varying forms have in all cases been produced on Mendelian lines. It is now better understood how in view of the interaction of numerous factors quite small variations can be transmitted on Mendelian lines. It is also fairly certain that by alteration of the gene complex the lethal effects of certain characters can be lessened or done away with. Moreover, there is evidence that in a similar way a character can change from being recessive to being dominant. In view of progress on these lines there is no longer so much difficulty as before in interpreting mimicry on Mendelian lines.

3. Very recently a hypothesis has been put forward by another countryman of ours, who is known to many of you, and to whom

some of you have listened in this room. I refer to Major Hingston and to his theory of Colour Conflict. Whether the theory will be developed and amplified and discussed until it becomes as well known as the theory of Mimicry is for the future to decide. Meanwhile we should not neglect the ideas put forward from such a quarter with the support of a powerful array of facts in many branches of zoology. In his preface Major Hingston announces that his idea contradicts Sexual Selection and modifies Natural Selection. This, coming from an eminent naturalist, an enthusiastic admirer—indeed a biographer—of Darwin, at once arouses our curiosity. Here will be something novel. Not that criticism of Darwin's theories is novel—far from it—but here we may expect a different type of criticism from that to which we have become all too accustomed. The author describes his theory as that of Colour Conflict. He pictures all animals, birds, insects, etc., as having two chief emotions, the one fear and the other anger. By virtue of their fear they possess colour, markings, patterns, etc., suitable for concealment; by virtue of their anger they have weapons for actual fighting or bright colours for threat. He is at great pains to urge that bright colours, conspicuous markings, tufts, and the like are not adornments intended to please but threats to terrify. He regards the concealing uniform as primary or fundamental, and the threatening one as superimposed. Each particular species develops the threatening side of its nature as far as circumstances permit, but this development is continually kept in check by the fear of danger. This fear is all the time holding back and checking the threat. The two inward emotions are struggling for the mastery, and this inward struggle is accompanied by an external manifestation, namely the possession of a uniform which may be either concealing or threatening according to the needs of the moment. The outward appearances are governed by the struggling emotion within. Hence the term, Colour Conflict. These ideas are exemplified by a consideration of mammals, of birds, of reptiles and batrachians, and of insects. Considerable stress is laid on the contention that much of the fighting in certain species of animals, many species of birds, and nearly all species of insects, is by way of threat and bluff. This replaces—sometimes partly and sometimes wholly—the physical rending and tearing of most mammals. It is called psychological warfare.

Let us turn to a few examples to see more clearly what is meant. Major Hingston chooses the lion as his first and primary example.

He points out the concealing nature of the general tawny colour of the animal's coat and goes on to point out that the lion has three areas where this colour is replaced by brown or black. The three areas are the mane, the tail tuft, and the tips of the ears. He says that when the lion stalks its prey the areas of darker coloration are kept out of view because the dominating emotion is fear—the fear of being detected by its prey. In the final rush, when concealment can no longer be maintained, the threatening areas are made prominent with a view to terrifying the victim and thus adding the weight of fear to its already formidable weapons. This transformation is quickly effected by erecting the hair of the mane so as to show the dark tips, by raising and lashing the tail to show the terminal tufts, and by turning the ears to exhibit their dark patches. Precisely the same threats are employed in fighting with other lions as are employed in overwhelming prey.

He gives numerous examples of the threatening methods of other animals in the course of which he puts forward the view that the hairy coat of animals is primarily for the purpose of threat and only in a secondary way for keeping the owners warm. In this connection attention is drawn to the widespread use of the hairy coat as a threat by means of the erection of hairs which are often tipped with darker colour.

Turning to birds he is at pains to show that the bright patches, crests, plumes, etc., are in positions corresponding to those of similar markings, etc., in animals. In showing how birds use these markings, etc., for purposes of threat he maintains that their fighting is to a great extent a matter of bravado, display, and gesture. This accords with the contention that the function of feathers is in a substantial measure that of threat. That this function is an important and deep-seated one is evidenced not only by observations of behaviour but also by the fact that the markings in the threatening areas—such for example as certain markings on the wings and tails of pigeons—are very persistent, tending to remain unchanged when other features are modified by domestication or other causes.

The power to use the covering of feathers for threatening or concealing purposes according to the needs of the moment is claimed to exist in birds as in mammals. It is pointed out that many birds have crests which can at one time be depressed and hidden and at another time be erected and conspicuous. Similarly with wing and tail markings—especially the outer feathers of the

tail. Passing over what is said about reptiles and batrachians, let us consider how the hypothesis works in regard to insects. More than ever for insects and especially for butterflies is it necessary to rely on the idea that bright colours are mostly for threat. The fact that more often the bright colours of butterflies are on the upper surface of the wings and therefore readily visible in flight is held to be compatible with the use of the colours as weapons in a psychological warfare. That these bright colours on the upper surface of the wings are often on the outer area where they would be most visible is urged as additional evidence. It is remarked how butterflies have the habit of basking with slowly expanded wings and of sailing in the air with wings outstretched. These are claimed to be methods of using the bright intimidating colours of the upper surfaces of the wings, the basking being particularly suitable for the defence of territories or favoured spots. According to the theory the eye spots so familiar in many species are purely threats. Further, the possession of a uniform available at will for concealment or threat is readily established, for have not the wings of very many species of butterflies bright conspicuous upper surfaces and dull concealing undersides? Others have bright eye spots on the under surfaces, but the wings are so held that these spots are invisible when the insect is at rest but displayed when it is disturbed.

It will be recollected that as part of the theory it is suggested that the fundamental pattern of animals, birds, insects, etc., is a concealing one and that the threatening coat is developed only as circumstances permit, that is, in proportion as the fear of enemies decreases owing to some special protection. That distasteful insects are brightly coloured on both surfaces of the wings fits in with this idea—though of course, the fact is capable of another very well-known explanation.

If it is correct that the concealing colours are the more fundamental and at the same time correct that the undersurface is more often used for concealment than the upper surface then it would seem to follow that the patterns on the under surface would be more useful for the purposes of grouping butterflies into genera. It is claimed that in fact this is often the case; the affinities of one species to another being more readily suggested by the underside markings.

Turning to moths there are first the day-flying species whose colourings seem to bear the same interpretation as do those of the

butterflies. It is not surprising that the second group, the nocturnal species, do not offer so many instances which can be cited in support of the theory. For one thing they are, as a class, of concealing disposition, and secondly there is the almost insuperable practical difficulty of observing their habits during their period of activity. We may know a great deal about the larval history of a nocturnal moth, we may know its precise habitat, its time of emergence, its feeding habits as an imago, but of its habits in rivalry with its fellows or in evading its enemies we know very little. Nevertheless colour conflict is said to be witnessed in some truly nocturnal moths such as the common yellow underwing. When at rest these moths are inconspicuous to a degree, but in the act of making off when disturbed they flash out a display of bright colours which is argued to be a threat to enemies—not a prolonged threat but a temporary disconcertment sufficient to facilitate escape.

In the case of caterpillars, the bright colours can readily be shown to have an intimidating effect, and, seeing that caterpillars have no sexual life it is easy to argue that these colours do not arise from Sexual Selection. But it is more difficult to show, in the case of such passive creatures, that there is any active threat or that the colours are anything more than what is commonly called warning coloration. The difference may seem one of words only, but for the purposes of the theory it is far from being without significance.

If the bright colours of lepidoptera can be looked upon as being for the purpose of threat against rivals among their own kind and against outside enemies then it is not difficult to imagine that a similar case can be made out for brightness in other orders of insects, such as the wonderful colours of dragonflies, the luminescence of certain beetles, or the vivid colours which certain grasshoppers and mantids display in the face of danger.

In developing the argument that much of the fighting among animals themselves is by way of threat, attention is naturally drawn to the fact that many animals have their tusks and horns developed to a degree far beyond that of maximum mechanical efficiency. These weapons are often so large as to be difficult to use—apart from their being heavy and cumbersome. Some animals possess weapons so placed that it is impossible for them to be used physically. It is suggested that for purposes of psychological warfare these extravagant appendages are of great value, so much so that it is an advantage to the species for them to develop in size until they secure more by threat than they could by action. To entomologists

this is of interest because many exotic beetles and a few of our native species possess weapons of this sort. It is said of our male stag beetle that despite its larger horns it cannot nip one so effectively as the less imposing female.

It remains to notice some further matters arising in the development of the theory. The phenomenon of moulting—so familiar in birds and animals, is explained as an instance of colour conflict. The concealing colours of winter give place to the brighter colours of spring, which are claimed to be useful for fighting—either as an added terror if the fighting be physical, or part of the main armoury if the fight be psychological. Another phenomenon very familiar to entomologists, namely sexual dimorphism, is fitted into the theory. It is urged that the males are usually the more brightly coloured, or, if it is a case of light or dark coloured, the more darkly coloured. These colours of the males are said to be more threatening and to be due to the fact that the males have greater hostility. The reason for the greater hostility is said to be because in addition to enemies outside they are concerned with rivalry against their own kind.

An attempt is made to explain certain geographical varieties (to use the author's own expression) and through them the arising of new species. With great care and in exact detail it is expounded in regard to birds that these geographical varieties are made evident by difference in just those markings, etc., which are of threat value, and that these differences are more marked in the males than in the females. The suggested reason is that differences of environment enable the overriding hostile emotion to be developed in different degrees. If it be in fact the hostile emotional content that varies, then naturally the variation will be apparent mostly in the threat marks and mostly too in the males.

Lastly it is suggested that the true explanation of melanism may be found in the colour hypothesis. It has been put forward from time to time that melanism is a direct result of moisture. This is now questioned and the alternative suggestion is that moisture increases the growth of vegetation, which in turn affords more protection, thus allowing the hostile emotional content greater freedom of development.

It will be evident that if the theory of colour conflict be accepted it will, in a great many cases, no longer be necessary to look to Sexual Selection for an explanation of bright colours and markings. But it will be recalled that it was claimed for the theory that it

contradicted Sexual Selection. This attitude is maintained throughout in discussion, and, moreover, a small section is devoted to marshalling objections to Darwin's theory. However, there is so much constructive work in the book that very little space is left for destructive argument. That this is so is all to the good for I hold that the more we ponder the various biological theories, Natural Selection, Mendelism, Mimicry, Colour Conflict, etc., and especially the more we try them out in the light of our own observations and experiments, so much the more do we realize how they are interlaced with one another, are interdependent, and are, in some baffling but beautiful way, part of one great entity.

Mite Galls.

By M. NIBLETT.—Read 8th March, 1934.

The family of Mites which are the cause of galls upon plants is called *Eriophyidae*; this family is divided into two sub-families, *Eriophyinae* and *Phyllocoptinae*, which are split up into a number of genera: *Eriophyes*, *Phyllocoptes*, *Monochetus*, *Epitrimerus*, etc.

These growths were noticed by naturalists and others very many years ago, and there was much speculation and controversy as to the cause of them. The botanists appear to have concluded that they were of fungoid origin, and called them *Erineum*. Andrew Murray was the first British observer to give serious attention to these creatures, and in his work on Aptera, published in 1876, there was included some very interesting and useful information about the *Phytopti*, as he designated them.

Since that date they appear to have been sadly neglected by British naturalists, although in recent years several lists of Mite Galls have been published by British observers. They have however, been studied by a number of Continental naturalists: Dr. Nalepa of Vienna studied this group closely and established numerous genera, species, etc., and has published the result of work in various Continental publications.

The mites themselves are very small, varying from 310μ long by 60μ broad, to 90μ long by 30μ broad. They are cylindrical and vermiform in shape, and as in all Arachnids the head and thorax are not separated, but form what is termed a cephalothorax, and as in all mites the abdomen is fused to the cephalothorax. The head and thorax are covered on the dorsal surface by a shield-like plate which has numerous markings upon its surface, these markings are of considerable value in the identification of different species. The head is pointed, giving the creature the appearance of having a snout.

The maxillae are 3-jointed and are used as antennae. The elongated abdomen diminishes in size towards the tail and is ringed all round, the number of rings varying from 40 to 95. In the *Eriophyinae* the rings (or rather half rings) are nearly equal in width upon both dorsal and ventral surfaces; but in the *Phyllocoptinae* the dorsal half-rings are distinctly broader than the ventral. Several (usually seven) pairs of setae are present on the body and are apparently organs of touch.

The tail is divided into two semicircular flaps, and it bears at its extremity a pair of setae much longer than the others. The

mites have no special respiratory or circulatory organs, the exchange of gases taking place through the body-wall; there is no heart, and the fluid analogous to blood moves irregularly throughout the body. There is no stomach, digestion taking place in the large intestine. Salivary glands and Malpighian tubules are also wanting.

The skin is formed of a very thin colourless layer of chitin, beneath which is a network of cells containing pigment. There are four legs all exactly alike, they are five-jointed and are situated near the head; they usually have a number of small bristles upon them and terminate in a small claw.

The colours of the mites are white, and orange-yellow to brownish-yellow. The female lays large numbers of eggs, the membrane of which is composed of chitin; they are either round, elliptical or ovoid. The larvae are very similar in appearance to the parents, but are smaller in size and have fewer setae, they moult at least twice, the sex not being manifest until after the second moult. The nymphal stage is characterized by the development of the sexual organs.

The adult mites spend the winter in buds of plants chiefly, or in the earth. They are very sensitive to the action of light, and evade sunlight which kills them. A number of species do not make galls, but live in them asinquilines, or else prey upon the gall-causing species. If a gall is cut open and examined through a magnifying glass, it is usually possible to see the mites crawling about amongst the hairs, and not infrequently the eggs may also be seen; but to view them properly it is best to wash them out on to a glass slide with a little water, when they can be examined under the microscope. Many of the Eriophyid galls are quite conspicuous objects, while others are very difficult to find, and when found are apt to cause one to remark, can we call this a gall? This applies more particularly to the bunches of axillary hairs in the angles of the leaf-veins which are so designated, but as there is in these cases an increase in either the numbers, or size of the hairs, or perhaps a change in the form of the hairs due to the action of the mites, they must I feel, be classed as plant-galls.

I am afraid that I have not given this section of gall-causers the attention they deserve, but must plead lack of time rather than of inclination. The field covered by causers of plant galls is so vast, and the problems in connection with them waiting to be solved so many, that one is obliged to concentrate upon a small section of the group, in the hopes of solving perhaps a few of the many problems awaiting solution.

The mites affect many families of plants, chiefly attacking the leaves, although both leaf and flower buds are also affected.

The leaf galls may consist simply of an increase of the number of axillary hairs with no deformation of the leaf itself; there may be an area of the leaf surface covered with a felt of fine hairs, with or without deformation; another form is where the leaf is bulged or

puckered to such an extent that it is converted into a pouch; sometimes the margin of the leaf is folded or rolled in its entirety, or only a portion of the leaf edge may be involved, there is with this type of gall frequently a considerable thickening of the part attacked by the mites. The remaining type of leaf gall is a raised pimple, or pustule, usually upon the upper surface of the leaf; these may vary very much in size, shape and colour, they all have an opening on the opposite side of the leaf, are hollow and contain numerous hairs.

The leaf-bud galls take the form of buds swollen often to many times their normal dimensions, which fail to expand and finally perish.

Flower-bud galls are somewhat similar, the buds becoming swollen and failing to mature.

There are a few other types of mite-galls, but the majority fall into one or other of the groups just mentioned. The number of species of plants known in Britain to be galled by these Eriophyids is about 190, and the number of species of mites affecting them is about 170; there is one rather interesting point to be noted here: all woody plants, that is trees and shrubs, are in nearly every case affected by numerous species of mites, while herbaceous plants have in the majority of cases only one, occasionally two, and rarely three species attacking them.

Many species found in Britain have apparently a wide distribution, they being recorded also from mid-Europe, Portugal and Sweden.

I do not propose giving a list of the mite-galls found in Britain, or attempting a detailed description of many of them, but will refer to several which are very common objects of the countryside, and which undoubtedly the majority of you have seen at some time or other.

The specimens I am showing are examples of many typical forms which occur.

Probably the most familiar leaf-gall is that of *Eriophyes macrorhynchus*, Nal., which takes the form of small eruptions upon the upper surface of the leaf, green at first, then turning to red; the galls of this species occur upon the leaves of Maple (*Acer campestre*, L.), and Sycamore (*Acer pseudo-platanus*, L.), usually in considerable numbers, and may be found from mid-May to quite late in the year.

Eriophyes macrochelus, Nal., is another species rather similar in appearance but usually much larger in size, and frequently with the colour of the gall running to purple; this may often be found in the same situations, but I think more frequently upon Maple than upon Sycamore.

A variety of *E. macrochelus*, v. *erinea*, Trott., takes the form of a whitish felt, which sometimes covers the whole of the underside of a leaf, this again affects both trees, but I have found it comparatively scarce upon Sycamore.

Eriophyes viburni, Nal., also causing a pustular type of gall may frequently be found in some numbers upon the leaves of *Viburnum lantana*, L., and more rarely upon those of *Viburnum opulus*, L. I have found this species to be very local, having found it in profusion upon *V. lantana* in certain localities, but in many others where the plant occurs abundantly, I have been unable to find a single gall; its occurrence upon *V. opulus* is even more localized, as I have found it at only one locality although I have searched for it upon this plant over a wide area for a number of years.

The Lime (*Tilia* spp.) is the host of quite a number of species of Gall-mites, the one probably most frequently noticed is the "Nail Gall," caused by *Eriophyes tiliae*, Pagn. Its popular name is certainly applicable, as a leaf studded with these galls does look as though it has a number of nails projecting from its surface. The gall of this species is not at all uncommon, and where it occurs is usually to be found in some numbers.

Eriophyes tiliae, Pagn., v. *liosoma*, Nal., causes quite a different type of gall, which takes the form of a felting of the underside of the leaf, with a yellowish pustule upon the upper surface, frequently when the mites are plentiful, involving the whole of the leaf.

Eriophyes tiliarius, Can., attacks the flower-bracts of Lime, causing a swelling of the edge sometimes involving the whole length, and sometimes occurring at intervals along it; this species is usually to be met with quite frequently, and sometimes the bract is so curled that it envelopes the flower-stalk, but it does not appear to affect the development of the flower.

Monochetus sulcatus, Nal., affects the leaves of Beech (*Fagus sylvatica*, L.), causing them to fold into a peculiar fan-like arrangement, a form of gall which I believe is unique.

Eriophyes galii, Karp., a species which is to be found upon eight species of *Galium*, causes the leaves to become contorted and generally sickle-shaped; it may usually be found in fair numbers upon the more common species of *Galium*, and more particularly perhaps upon *G. aparina*, L., and *G. saxatile*, L.

Epitrimerus trilobus, Nal., attacks Elder (*Sambucus nigra*, L.), causing a rolling of the leaf-edges with little hypertrophy, but the leaves are usually much crinkled. This species shows a decided preference for young leaves.

There are a number of Eriophyids affecting leaf-buds and causing what is commonly known as "big bud."

Eriophyes ribis, Nal., the cause of "big bud" upon currant bushes is most probably the most well-known, it being a pest of some economic importance. The black currant appears to be the chief sufferer, but it also attacks red and white currants and gooseberry.

Eriophyes rudis, Can., is to be found upon Birch (*Betula*, spp.), the buds affected swelling to many times their normal size and when fresh are covered with a white pubescence.

Eriophyes avellanae, Nal., is to be found upon Hazel (*Corylus avellana*, L.). This species of mite causes both the buds and staminate catkins to swell, and the galls are usually to be found in some numbers where Hazel bushes occur.

Eriophyes psilapsis, Nal., is the cause of "big bud" upon Yew (*Taxus baccata*, L.). This species does not occur very plentifully as a rule, but a few specimens may generally be found where Yews grow. It has been recorded at times as causing serious damage to Yew hedges.

Of the species of mite causing galls on flowers, that of *Eriophyes triradiatus*, Nal., is perhaps the most conspicuous; the gall is composed of catkins greatly deformed, and when fresh is not unsightly, but it is more frequently noticed when the plants are leafless, as an ugly black mass, and where it is abundant in this state it is certainly far from ornamental. It has been recorded in Britain as occurring upon twelve species of *Salix*, but it occurs "I think" most frequently upon the Crack Willow (*Salix fragilis*, L.). Several species of Eriophyids have been associated with these galls by Continental observers, but it is more than probable that all the galls of this type found upon the various species of *Salix* are caused by one species of Eriophyid.

Eriophyes fraxini, Nal., upon the flowers of Ash (*Fraxinus excelsior*, L.), which become swollen and distorted, is a gall which also assumes a considerable size, and is not unlike a small cauliflower in form.

Eriophyes origani, Nal., is to be found upon Marjoram (*Origanum vulgare*, L.); the corolla, calyx and leaflets are all covered with a mass of fine hairs, and when numerous the panicles form whitish globular masses. This species, as do many others of this family appears to be quite local in its occurrence. I have seen in some localities large clumps of Marjoram without a single gall, whilst in others it was difficult to find a plant not galled.

There are quite a number of species of plants whose flowers are attacked by Eriophyids, resulting in *Chloranthia* (greening), varying degrees of hypertrophy, and sometimes partial doubling of the flowers.

I could continue indefinitely, describing various forms of galls caused by Eriophyids, but will not tax your patience any longer, trusting that these rather incomplete remarks have conveyed to you at least some general idea of Mite Galls.

The Genus *Taeniocampa*.

REPORT OF A DISCUSSION.—26th April, 1934.

Mr. C. G. M. de Worms opened the discussion by reading the following note :—

The *Taeniocampa* form a group of the Noctuid moths, which is familiar to all collectors of the Macrolepidoptera and especially to the beginner in this pursuit. The members of this genus are the first Noctuids of the new season, their appearance always ushers in the spring months, and coincides with the blooming of the willow, on the blossoms of which they are readily obtainable.

As to the Classification of this group, Seitz has replaced the name *Taeniocampa* by that of *Monima*. The genus comprises 20 species, three of which are confined to S.E. Europe and Asia Minor, seven to Japan and Amur, and nine to Europe in general, including the British Isles. The last section comprises *gothica*, L., *miniosa*, Esp., *stabilis*, View., *pulverulenta*, Esp. (*cruda*, L.), *populeti*, Tr., *incerta*, Hufn., *opima*, Hb., *munda*, Esp., and *gracilis*, F.

I will first deal with general characteristics of the group and then with those of the individual species.

Tutt divides the nine species into three sections:—(1) *munda*, *incerta*, *opima*, *gracilis*. (2) *populeti*, *gothica*, *stabilis*, *pulverulenta* (*cruda*). (3) *miniosa*. This division is based upon anatomical differences. The variation of colour of the imagines of this genus is remarkable and each species has a form resembling its neighbour.

As to the anatomical features of the imago, the antenna of the ♂ is strongly pectinate except in *incerta* and *opima*, with ♀ antennae serrate.

With regard to the distribution of the nine species all except three are very widely spread in the U.K. The three distinctly local species are *populeti*, *opima* and *miniosa*. These three are usually fairly abundant where they are found.

As to times of appearance the first of the season are *gothica*, *incerta*, *munda*, *pulverulenta* and *stabilis*, about mid March; *populeti* early April; *miniosa* end April; *opima* and *gracilis* late April.

The larvae of the group are similar in anatomy but very variable in colour—all feed on trees, shrubs, or low plants.

The ova are somewhat flat and ribbed and are laid in clusters on twigs. Those of *opima* are laid in a ring around a twig.

With regard to the individual species, *T. gothica* has a very wide distribution both in this country and abroad. Found throughout Europe, Central Asia and Japan. In this country all over U.K. Imago out mid March to mid May. Larva feeds on low plants and foliage of trees.

Many (Tutt mentions seven) colour forms of this insect have been described.* Probably the most well known is *gothicina* (in which the black wedge-shaped mark is obliterated) found in Scotland and N. England.

T. stabilis, another insect very common and of wide range. All central Europe, Asia Minor and all over the Brit. Isles, though less common in Scotland. Moth mid March to end of April. Larva on many trees, chiefly oak. Six colour forms are described by Tutt chiefly shades of grey, red and brown.

T. pulverulenta (cruda). The same distribution as *stabilis* in U.K. and abroad. Larva same foodplants as *stabilis*. Moth mid March to mid April. Tutt mentions six colour forms of this species.

T. populeti. Only central and northern Europe. Local in S. England. Infrequent in Scotland. Imago throughout April; larva feeds only on members of poplar family and lives between spun-together leaves of foodplant. Six forms are described by Tutt ranging from pale grey to black.

T. incerta. Very wide distribution over Europe and N. Asia. Found everywhere in British Isles. Imago mid-March to mid-April; larva on foliage of most trees and shrubs. Tutt describes 16 forms varying through purple, grey, black and red. Northern forms are very fine, red, brown or straw coloured.

T. opima. Found N. Europe, Asia, very local in British Isles—only Northern England and sparingly in south. Imago mid April to mid May; larva chiefly on Sallow. Seven forms described by Tutt.

T. munda. Europe and N. Asia, found in England, rare in Scotland. Imago mid March to mid April: larva chiefly on oak. Tutt describes four colour forms. Colour range, grey, straw and red. The best known variety is *immaculata*, Stdgr., without any of the usual "twin spots" on the subterminal.

T. miniosa, found in most parts of Europe and Asia Minor, less common and very local in England; found in most southern counties and northwards to Lancs. Imago last three weeks of April; larvae feed gregariously on oak. Northern forms darker than southern.

T. gracilis. Found throughout Europe and Japan and very widely distributed in British Isles and Scotland. Imago end of April to end of May; larva chiefly on low plants and willow. Great

* As well as several sub-varieties based on the development of the "gothic-mark."—EDS.

variety of forms including fawn, white, orange, pink, red, and dark brown. Red forms in New Forest feed on Sweet Gale. Scotch forms are pink, N. Kent are dark brown (marshes).

Mr. de Worms exhibited ova of *T. incerta* from Folkestone, young larvae of the same species from Aviemore and young larvae of *T. munda* and *T. populeti* from Byfleet.

Dr. E. A. Cockayne contributed the following :—

“ Superficially the *Taeniocampa* in the imaginal state appear to form a compact genus, but an examination of the larvae shows that this impression is incorrect. To illustrate this I am showing full-fed blown larvae of all the species except *opima*, the larva of which is in the penultimate instar.

Gracilis has larvae of various shades of green, chestnut, or brown, and in one form the surface above the spiracular line is nearly black. *Opima* has similar green and brown forms and there is also one of a deep purplish colour. In both species the darkening of the green ground or the brown, black or purple coloration is due to a similar arrangement of freckles, which form a fairly broad continuous band above the wide and conspicuous lateral stripe. These are the only two species, which show a close resemblance in the larval state. The pale green form of *gracilis* is not unlike *incerta* in some respects, but the latter has a continuous narrow black line just above the lateral stripe, whereas in *gracilis* there is a much broader band of black freckles on the thorax, especially on the prothorax, and no black line at all on the abdominal somites. In the box is a form of *incerta*, of which I have never seen a description. From a female taken near Pulborough, Mr. A. J. Wightman reared a brood of larvae and about half of them had small irregular black marks arranged longitudinally all over the dorsal and ventral surfaces, even extending on to the prolegs and becoming confluent to form continuous lines at the edges of the dorsal, subdorsal, and spiracular stripes. These stripes were pure white, as were the opaque freckles scattered over the skin between them. In a few larvae the skin was so heavily freckled as to appear blackish green dotted with pure white and pale blue-green. The head was green, though in some larvae the setal plates were brownish. *Stabilis* resembles the yellow-green form of *incerta* in having opaque yellow freckles between the stripes, but the dorsal stripe is narrower, there is no black line above the lateral stripe, and there is a conspicuous transverse yellow stripe across the posterior part of the eighth abdominal somite, which is lacking in *incerta*. *Pulverulenta (cruda)* has three fairly distinct forms, the common one with whitish ground and dark brown or blackish transverse bands, a chestnut form, and a green one, which often has a longitudinal red mark in the lateral stripe on the seventh and eighth abdominal and sometimes on the other abdominal somites ; occasionally the red marks are present on

the thoracic somites as the specimen depicted in Wilson's "Larvae of the British Lepidoptera" (Pl. 36, fig 9a). All the forms have many small spots on the head, but in the green ones these are greenish and indistinct; in the dark forms there is a narrow transverse line on the posterior part of the eighth abdominal reminiscent of that seen in *stabilis*. *Gothica* lacks the opaque yellow or white dots of *incerta* and *stabilis*, being plain green with a broad white lateral stripe, and its head is smaller. *Munda* with its ground colour varying from red-brown to dark brown is different in both colour and pattern from all the other *Taeniocampa* and has a larger head than any of them. The larva in its last instar often hides in cracks on the bark of tree-trunks and in possessing this habit is unlike any of its congeners. *Miniosa* also has a coloration and pattern different from those of the other species. There are two distinct forms, one with yellow stripes the other with deep orange ones, and in both the extent of the black markings is very variable. *Miniosa* also remains gregarious until a much later stage than the other *Taeniocampa*. In the larval stage the species most divergent from the rest appears to me to be *populeti*. Apart from other differences its larva has a much thicker skin with very little of the yellow pigment which is present in the skin of the green forms of other species. It always has a large black mark on each lateral lobe of the head, and the clypeus (front of Fracker) is largely or wholly black, but the extent of black is variable. Sometimes the lobes are black except for a narrow stripe on the side of each and a narrow line where they meet in front, but a pale mark like an inverted Y nearly always persists, the tail formed by the junction of the lobes and the limbs by the epicranial sclerite, though sometimes even this sclerite is dark brown. The habit of making a house between two leaves and lying with its body curved is peculiar to *populeti*.

The figures in Pierce's "Genitalia of the British Noctuidae" show remarkable structural differences between the various members of the genus and confirm the impression, gained from a study of the larvae, that none of them are very closely related. I will take them in the same order as the larvae and point out some of the chief differences. In *gracilis* and *opima* there is a corona on the harpe, which is absent in all their congeners, and I think this proves that the similarity between their larvae is not merely superficial and that they are more closely related to one another than to any other member of the genus. Nevertheless there are important differences between them. *Opima* has a protruding pollex clothed with small spines towards its termination, and this is absent in *gracilis*. The uncus in *opima* is broadened at the end while that of *gracilis* is pointed. In *incerta* the juxta is deeply cleft and differently shaped from that of any other species. *Stabilis* has a scobinated ampulla, a structure which is smooth in all the others, and the uncus is tongue

shaped, laterally emarginate and apart from its different shape is very much larger than that of other *Taeniocampa*. *Gothica* is remarkably unlike the others. The harpe is a different shape and from the upper part of the cucullus a short digitus arises; in the others there is no digitus. The uncus is broad at the tip, almost bifid, and is therefore unlike that of any of the other species, but the greatest structural difference is in the juxta, which has two long curved scobinated arms arising from a collar. *Pulverulenta (cruda)* has a pointed uncus and unlike all the rest its juxta is peaked in the centre instead of being depressed or cleft. *Miniosa* also has a pointed uncus and only a small depression in the centre of its juxta, but the harpe is produced into a hook at the anal angle and cannot be matched in its general outline by any other species. *Munda* and *populeti* both have a cucullus with projections on it, though their number and size are different, but *munda* has a long arm arising from the sacculus, which is absent in *populeti*. In addition to other differences between these two species *populeti* has a vesica without cornuti, and I believe it is the only *Taeniocampa* with a vesica of this kind.

There are a few disconnected remarks, which I should like to add. No hybrids have been bred to my knowledge, but pairing of *gothica* and *stabilis* have produced fertile eggs, and pairings between other species have been observed. At Wye I once found a male *stabilis* paired with a female *pulverulenta (cruda)*, but no eggs were laid.

The late Hon. N. C. Rothschild obtained several pure white *gracilis* in Wood Walton Fen, and I found that the scales of two, which he presented to the British Museum, were devoid of pigment, thin, and curled up. A white *gothica*, probably with a similar defect of the scales, was taken by Renton in Argyleshire.

There is a record of a *gracilis* with the forewings black except for a pale border around the stigmata (Everingham, "Ent. Month. Mag." 1924, p. 21). Mr. J. C. F. Fryer once bred large numbers of *gothica* for several generations starting with eggs from a single female and from time to time obtained a few specimens with the hollow in the gothic mark filled in with black scales to form a rectangle. Eggs laid by a pair of this form or by a male or female of it crossed with a normal *gothica* always proved infertile, so that it is a completely infertile recessive.

I am told that nearly all the larvae of *gracilis* found on bog myrtle in the New Forest produce red or brown forms, though now and then there is a dark grey one amongst them, and that normal pale grey specimens are taken on sallows growing close to the bog myrtle. The colour cannot be due to the food-plant, because larvae are common on bog myrtle at Rannoch and produce normal grey forms as well as the pink ab. *rosea*, Tutt.

Mr. Robert Adkin showed series of *T. gothica* from Shetland, Orkney, Rannoch and other Scottish localities, Ireland, North Wales

and southern England; and *T. incerta* from Scottish localities, Yorkshire and the New Forest. Referring to *T. gothica* he said that, as Tutt pointed out long ago ("Brit. Noct." II. p. 150), the reddish Scotch forms with the gothic mark obsolete, that we were wont to call var. *gothicina*, were certainly not *gothacina* of Herrich-Schaeffer but should, he thought, be known as sub-var. *obsoleta-rufescens*, Tutt. Herrich-Schaeffer's figures represent a dark slatey-grey form with a fairly distinct rusty-red gothic mark. With regard to *T. incerta*, he said that colour variation appeared to be much the same in both the Scotch and South English specimens, but that in those from Yorkshire the light forms appeared to be missing, their general tendency being towards the darker shades.

Dr. K. G. Blair exhibited a box of Hymenopterous parasites of the genus *Taeniocampa*, with the following note.

The species of this genus are for the most part rather heavily parasitized in this country.*

T. opima, *T. munda* and to a less extent *T. pulverulenta* are exceptions to the general rule, while *stabilis* is victimized by the greatest number of species of parasites.

Most of these parasites are polyphagous, i.e., attack a more or less wide range of hosts, while others, among which may be mentioned *Spudastica krieckbaumeri*, Bdg. with its peculiar jumping cocoon, and *Meniscus murinus*, Gr. appear to limit their attentions to larvae of this genus, frequently causing a very heavy mortality.

Much work however remains to be done and records accumulated before we can form an opinion upon the frequency of attack by any parasite upon a particular host.

* See Morley and Rait Smith's list in "Trans. R. Ent. Soc. Lond." 1933. But these numbers will no doubt have to be considerably increased. This list also fails to indicate the frequency of attack by any parasite upon a particular host.

Parasites of British spp. of *Taeniocampa* (*Monima*).

	goth.	incert.	pop.	stab.	grac.	min.	mund.	pulv.
ICHNEUMONIDAE.								
<i>Coelichneumon derasus</i> , Wesm.	+							
<i>Cratich. fugitivus</i> , Gr. ..	+	+						
„ <i>fabricator</i> , F. ..			+					
„ <i>nigritarius</i> , Gr. ..						+		
„ <i>coruscator</i> , L. ..						+		
<i>Ich. latrator</i> , F. ..				+				
<i>Ctenich. castigator</i> , F. ..		+						
„ <i>melanocastaneus</i> , Gr...								+
<i>Probolus alticola</i> , Gr. ..				+				
<i>Cryptus obscurus</i> , Gr. ..	+		+					+
<i>Pimpla brevicornis</i> , Gr. ..					+			

	goth.	incert.	pop.	stab.	grac.	min.	münd.	pulv.
<i>Glypta genalis</i> , Möll.						+		
<i>Meniscus plantaria</i> , Gr. ..			+					
„ <i>murina</i> , Gr.					+	+		
<i>Campoplex pugillator</i> , L. ..			+					
„ <i>confusus</i> , Fst.			+					
„ <i>ebeninus</i> , Gr.			+					
<i>Spudastica krieckbaumeri</i> , Bdg.		+		+	+			
<i>Meloboris crassicornis</i> , Gr. ..					+			
<i>Angitia interrupta</i> , Hlm. ..				+				
<i>Anilasta carbonaria</i> , Ratz. ..			+					
<i>Anomalon cerinops</i> , Gr.					+			
<i>Agrypon arquatum</i> , Gr.	+							
„ <i>anxium</i> , Wesm.		+						
„ <i>flaveolatum</i> , Gr.						+		
<i>Ophion undulatus</i> , Gr.	+							
„ <i>luteus</i> , L.		+	+				+	
„ <i>minutus</i> , Kriech.								+
<i>Astiphrominus strenuus</i> , Hlm.				+				
BRACONIDAE.								
<i>Rhogas nigricornis</i> , Wesm. ..		+						
„ <i>circumscriptus</i> , Nees. ..				+				
<i>Apanteles congestus</i> , Nees. ..		+						
„ <i>solitarius</i> , Ratz.				+		+		
„ <i>formosus</i> , Wesm.				+				
„ <i>ruficrus</i> , Hal.					+			
<i>Microplitis vidua</i> , Rthe. ..		+						
„ <i>mediana</i> , Rthe.				+		+		
„ <i>mediator</i> , Hal.				+				
„ <i>tuberculifera</i> , Wesm.						+		
„ <i>fumipennis</i> , Ratz.						+		
<i>Macrocentrus abdominalis</i> , F...		+						
<i>Zeletestaceator</i> , Curt.			+					
<i>Meteorus albiditarsus</i> , Curt. ..				+	+	+		+
„ <i>luridus</i> , Rthe.				+				
„ <i>pulchricornis</i> , Wesm.				+				
„ <i>scutellator</i> , Ruthe.				+				
„ <i>fragilis</i> , Wsm.				+				
CHALCIDAE.								
<i>Eulophus</i> sp.		+		+				
	5	10	9	16	7	10	1	4

Mr. C. N. Hawkins showed short series of *Taeniocampa gothica*, L.; *T. incerta*, Hufn.; *T. populeti*, Tr.; *T. stabilis*, View.; *T. gracilis*, F.; *T. miniosa*, F.; *T. munda*, Esp.; and *T. pulverulenta*, Esp., preserved specimens of their respective larvae and pupae, and a dead piece of the old seed head of *Hypericum* with a few ova of *T. gracilis in situ*, and said that the pupae are of the usual noctuid type with well marked labial palpi. They are rather short and stout in build, subterranean in habit, brown in colour and fairly substantial in texture. In *T. gothica*, *T. incerta* and *T. gracilis* the cremaster is short and broad and the main armature consists of two short, strong divergent spines situated at the outer posterior corners of the cremaster. In *gothica* and *incerta* these spines are straight and sharp pointed but in *gracilis* they tend to curve outwards into hooks.

In *stabilis*, *miniosa* and *munda* the cremaster is practically absent but the main armature again consists of two short, strong, divergent, sharp pointed spines. These spines are situated closer together at their bases than in the first group and owing to the reduction of the cremaster, appear to spring directly from the body of the pupa. They may curve slightly at the tips.

In *pulverulenta* there is no obvious cremaster and the main armature consists of a single spine, bifurcate almost to its base, or perhaps of two strong, divergent curved spines joined together at their bases.

In *T. populeti* the pupa is slightly more slender, darker in colour, with a short stout cremaster, tapering posteriorly almost to a point and the main armature consists of two moderately strong and fairly long spines which spring, close together, from the extreme posterior end of the cremaster. These spines converge for almost two thirds of their length and then curve strongly outward into definite hooks. The ends are blunt and slightly knobbed. All the pupae have the abdominal segments covered with fine pitting which becomes stronger towards the anterior margin of each segment, but the pupa of *incerta* is remarkable in that it has a short, transverse row of large and deep pits near the anterior margin of each of the abdominal segments 4-7 inclusive on the dorsal surface. Unfortunately I have no examples of the pupa of *T. opima*, Hb., so I cannot deal with that species.*

Messrs. J. A. Downes, L. H. Ennis, B. J. MacNulty and A. O'Farrell exhibited series of all British species of the genus *Taenio-*

* Since writing the above I have been fortunate enough to obtain two pupae of *T. opima*; a ♂ through the kindness of Mr. Wm. Quibbell of Brampton, who bred larvae ab ovo, and a ♀ from a larva found on *Salix repens*. In the latter case I bred the moth, so both pupae are authentic. This pupa is very like that of *T. incerta* but smoother and more polished; it has similar rows of deep pits on the anterior dorsal margins of abdominal segments 4-7 inclusive, but the cremaster is shorter and less obvious and the cremastral spines are more slender.—C.N.H.

campa to show the prevalence of 'parallel variation,' i.e., the development of corresponding forms in different species. Thus *stabilis* frequently has the stigmata touching whereas other species do not, but exceptional specimens of both *pulverulenta* and *incerta* (*instabilis*) showing this character are exhibited. Again several species, e.g., *opima*, *incerta*, usually have the central shade well-developed, and one or more specimens with this character are exhibited in each series: and conversely in most species forms are shown without this mark.

Among the more striking variations are specimens of *incerta* (*instabilis*) (a) with the creamy ground colour typical of *gracilis*, (b) with pale pinkish-brown ground colour like that often found in *munda*; also several specimens of *munda* with the dark spots along the subterminal line red or brown instead of black: in all other species the spots are red or brown normally.

Other members also contributed to the exhibit, and joined in the discussion.

The Correction of a Careless Error.

By HY. J. TURNER, F.R.E.S., F.R.H.S.—Read 10th May, 1934.

Apamea (Luperina) testacea, Schiff. was first described and named in the Vienna *Verzeichniss* of Schiffermüller in 1775, and first figured by Hübner in 1802. In 1852 Guenée, in Vol. I. of his *Noctuelles* (*Nat. Hist.* V.) p. 182, described a very pale form of this species, calling it var. A, but refrained from naming it.

In 1864 Doubleday, in the *Entomologist's Annual* for that year, described and figured an insect from North Wales, which he considered was a form of *testacea*, under the name of *guenéei*, in honour of Guenée, who had already suggested that it was probably his var. A. of *testacea*.

In 1889 South received a series of an insect from St. Anne's-on-Sea, Lancashire, which he considered to be a form of *testacea*, intermediate between Doubleday's *guenéei* and the continental species *nickerlii*, Frr. (*Ent.* XXII. 271) and gave them the name var. *nickerlii*. This was curious in view of the subsequent determination that this series was a form of the good species *nickerlii*.

In 1891, Tutt, *Ent. Record*, II. 20-1, in discussing this Lancashire form, endeavoured to show that it did not resemble *nickerlii*, but was a simple form of *testacea*, and to which he subsequently gave the name *incerta*.

In 1909, South, *Ent.* XLII. 28, reported on a further set of examples from the Lancashire locality. They were submitted to Mr. F. N. Pierce for examination of their genitalia. This proved them to be the *nickerlii*, Freyer, and not *testacea* at all. As to the specific status of Doubleday's insect from N. Wales we know nothing, but of Guenée's var. A. we have Oberthur's example.

In 1911 with the aid of the late Dr. Chapman, in much detail and assisted by his preparations of the genitalia of the various species and forms, including series of *nickerlii*, Frr., of continental *testacea*, of var. A. of Guenée (teste Obthr.), of *dumerilii*, L. with various local forms sent me by the kindness of the late M. Oberthür, and series of the beautiful forms from Lancashire, I proved that these last were a form of the continental *nickerlii*, Freyer, and not of *testacea*, Schiff.

Now comes the strange action, for which I must must be held responsible. We both failed to recognise the fact that we were not dealing with the *guenéei* of Doubleday, nor with a var. of *testacea*,

but with a hitherto unrecognised species for Great Britain, and carelessly applied the name *guenéei* to the Lancashire form instead of Tutt's name *incerta*. South's name of *nickerlii* for this Lancashire insect was necessarily invalid.

It was only a few weeks ago when I was revising the pages of Tutt's *British Noctuae* for the *Entomologist's Record*, that to my amazement, I found out my own error of nearly a quarter of a century ago. No one had found out my error, apparently no one even followed the arguments, and presumably no one was interested in the variation of the Noctuae.

Thus the name of the Lancashire insect is *nickerlii*, Freyer, ssp. *incerta*, Tutt (for which the name *guenéei*, Dbldy., had been used by us in error).

All the material, upon which the result of the revision was based, including a *nickerlii* from the late Dr. Nickerl's collection, were exhibited.

Some Races of *Lasiocampa quercus*, L.

By J. A. DOWNES.—*Read 28th June, 1934.*

In dealing with this species, it may be useful at the outset to recall a few details of its normal life-history.

The egg is dropped by the female while in flight, and not being covered by any sticky secretion, falls to ground unhindered. According to my experience it hatches after a period varying from 19 to 32 days, but usually after about 22 days. The young larva usually moults twice in the autumn and then hibernates; but not very completely since even in mid-winter it will come out on fine days, and when in captivity is fairly active throughout. After hibernation there are commonly three further moults and the imago emerges about July. This brief outline does not apply to the more northern forms of the species.

My chief object, however, is to separate and describe some of the local races into which the species can be divided. By a "local race" I mean a group of colonies inhabiting a certain area, the individuals of which agree more or less among themselves but differ from the form prevalent in another area. On account of the facts of variation and evolution the extreme forms of one area will commonly resemble the normal forms of another, but to show that a separate group or "race" really exists we have only to show that the average of the specimens in the two areas are distinctly different.

Here I shall deal with the variation of two stages only, namely the larval and the adult. The larva shows notable racial variation in all instars, but, since space forbids the description of each stage in detail, I select two characteristic ones—the third (just before hibernation) and the last. These two instars differ widely and some general notes on their significant features follow.

In the third instar larva the head (except the clypeus and labrum) is blue-black without any marking. The meso- and meta-thorax and the first seven abdominal segments are all more or less similar and are divided by transverse creases into 6 'subsegments.' Any or all of these segments may have, dorsally, a transverse orange band the middle part of which may be white. These white and orange marks, being very constant in any given area, are important; but the spiracular line and associated markings, being everywhere variable, are much less so.

In the last instar the larva still has a blue-black head, but, according to race, with a greater or less amount of orange-brown mottling. The body is now densely covered with hair, and though Bacot and Warburg, in their racial investigations, found the colour of this hair to be very important, in all the races I have dealt with it seems to be very uniform. There is now little marking on the back since the orange markings have entirely disappeared and the mid-dorsal white areas are smaller; indeed if they were already small in the 3rd instar they are now absent. The development of these marks furnishes an easy means of distinguishing the races to be described.

A similar outline of the significant variation of the imago is more difficult to give, since this is so variable everywhere. Many unreliable characters have consequently been used in the past, and it is necessary to separate at the outset those that are everywhere unstable or are merely dependent on the treatment of the early stages, from those which are constant over considerable areas of the insect's range.

To take the ground-colour first. This, as is known, is, in normal *quercus*, a deep chestnut-brown in the male, and a sandy-brown, more or less suffused with darker, in the female. It is not regarded as an important racial character, because some experiments mentioned by Tutt indicate that its variation is probably dependent on the conditions to which the larva and pupa were subjected. Using material from both Scotland and S. England it was shown that a high temperature acting on the early stages produced a paler and more red-tinted form (this red being most noticeable in the female), while low temperature produced a darker form. Now in nature we find a state of affairs consistent with these results. The Scottish specimens are on the whole much darker than those from S. England, which are also redder (but chiefly in the *male*) and have no darker suffusion in the female. A very similar tint is found in specimens from N. France, but in the south the female also assumes the red tint referred to above. It should be noted that in spite of this a particular race often does have a locally typical ground colour, because it is confined to a small area over which the climate is uniform.

Another character is the width of the yellow band on the wings. This, again, cannot always be relied on, since in most localities, but more noticeably in England than abroad, the yellow band may spread outward towards the edge of the wing, or may be narrow and have its outer border quite well defined.

We are therefore left with the following characters—the shape of the yellow band on both wings (judged by its inner edge, since this is always clearly defined); the presence or absence of a yellow patch at the base of the forewing of the male, and the shape of the white discal spot on the forewings. These I regard as the important characters on which to found races. [It should be noted that band

characters are as definite in the female as in the male; they are merely less noticeable in the female because the ground-colour resembles that of the band.]

Considering the various races separately :

VAR. *CALLUNAE*:—It is sometimes thought that there are several more or less unconnected races lumped together as var. *callunae*, and certainly there are conspicuous differences among insects passing as this form. This view, however, is shaken when it is recognised that the characters that are commonly relied on (because they are the most striking), namely the ground-colour and the width of the yellow band, are also, as I have tried to show, the least important. If one looks more closely, almost all the specimens from the N. of England are seen to agree in having the yellow band wavy and turned outward at the hindmargin on the forewing, and bent in the middle and turned outward (downward) at the anal angle on the hindwing. There is usually a distinct yellow patch at the base of the forewing of the male, and in a considerable proportion, about 40 %, of the specimens, the discal spot is triangular or diamond-shaped. The variation in the ground colour probably arises from the climatic differences in its various habitats—there is considerable difference, for example, between the conditions in the Yorkshire dales and the Scottish Highlands. But usually, as would be expected, the ground colour is dark brown in the male, while the female is sandy and much suffused with darker brown. There is in Devon and Cornwall however, a form that is identical with *callunae* in all essential points, but which, in the female at least, is quite as pale as ‘typical *quercus*’ from say, Kent [And in consequence, it is not generally considered that *callunae* does occur in the South-West]. I have seen larvae in their third instar from the Lizard, from Salcombe (Devon) and from the Lake District, and there are no apparent differences between any of them. On a typical segment, say the 2nd abdominal, the dorsal marks are present on, and increase in size from, subsegments 2 to 4, and there is also a small one on 5. That on 2 and the central part of that on 3 are white—the rest orange. The general effect is of a series of forwardly directed orange triangles with white apices, down the back of the larva. The full grown larva (examined from the Lizard, Salcombe, the Lake District, Perth, and Ballater) has no trace of any dorsal marks and its head is blue-black with very little red-brown mottling. In both stages the spiracular line is usually poorly developed.

Thus the larva furnishes additional reasons for grouping the form from S.W. England with that from Scotland in the race called *callunae*. Judging purely by the imago, it seems that this race occurs throughout Scotland, N. and W. England, Wales and Ireland. Perhaps, as Tutt suggests, it occurs also in N. Germany and Holland, but the evidence given consists merely in the fact that in those regions the species has a two-year life-cycle, as *callunae* has in

Scotland. But *callunae* from Devon and Cornwall, like 'typical *quercus*' from Kent, has a one-year life-cycle as described at the outset of this paper, and in either of these cases the life-cycle is extended to two years in unfavourable circumstances. It seems then, that the length of the life-cycle is of little importance here.

THE NORTH FRANCE FORM:—This will be considered before that from S.E. England. I possess specimens from Chaumont (Ardennes) and Tréboul (Finistère) and have seen others from Paris and elsewhere. The ground colour is normally reddish-brown in the male and sandy, without any darker suffusion, in the female; but the colour of the Finistère specimens is very dark and unlike that of any other form. [It is apparently not due to climatic factors.] In other ways the moths from the above localities resemble each other closely. The band on the forewings is comparatively straight, and at each end has a peculiar hook, while on the hindwings the band is not bent in the middle and does not turn down at the anal angle. There is never any yellow basal patch on the forewings of the male, and the discal spot is nearly always small and round.

The larva, unfortunately, I have seen only from Finistère, but it is probably very similar in the other localities. In the third instar the dorsal marks increase in size from subsegments 2 to 4, but are successively smaller on 5 and 6. That on 2 is wholly white and the rest are white in the middle but chiefly orange. The general effect is a series of orange diamonds, with a white median line, all down the back. In the full grown larva, although the orange has, of course, disappeared, the white areas are almost as large as in the younger stage. The head is so mottled with orange-brown that only a small amount of the blue-black ground colour is left, and the spiracular markings are usually well developed.

'TYPICAL QUERCUS':—To return to the English forms, there is, south-east of a line drawn from Dorset to the Humber, a form (or forms) commonly called typical *quercus*; of which Bacot says "They are very variable in the imaginal and in the larval state. It seems useless to lay down even the loosest rule." But in spite of this great range of variation the majority conform fairly closely to a definite type. In this, the band on the forewings is fairly straight, but turned slightly inwards at the hind margin, while on the hindwings the band is not bent in the middle or turned downwards at the anal angle. The discal spot is small and circular and there is no yellow basal patch on the forewings of the male. The colour is usually red-brown in the male, and sandy (without either dark suffusion or red tint) in the female.

The pale dorsal marks of the larva in its 3rd instar are like those of the N. France form in shape, but the white areas are somewhat smaller and the orange ones correspondingly larger. The adult larva retains the white dorsal marks on two or three subsegments, and there is always some orange mottling on the head.

It will be seen that this form is very much nearer to the 'N. France form' than to var. *callunae*, and, in fact, it very likely occurs in France, as I have specimens from Croix (Nord) that probably belong here.

The variation that occurs in S.E. England is either in the direction of the N. France form, or of var. *callunae*. For instance in some specimens the band of the forewings, instead of turning inward simply, is hooked at the hind margin; and the full-grown larva may have white marks on four or five subsegments, and an almost entirely orange head. Such forms are indistinguishable from those prevalent in N. France. Others however may have the band going straight towards, or turning outwards at, the hind margin of the forewing, while the discal spot is angular and a trace of the yellow basal patch of the male is present. And the full-grown larva may have only very small white dorsal marks and but little orange mottling on the head. All these characters point of course to var. *callunae*. In fact, this great variation is almost certainly due to an infiltration of N. French stock from the south and of *callunae* stock from the north, into S.E. England.

VARS. VIBURNI AND MERIDIONALIS:—These two races, which inhabit the south of France (Riviera), have been described by Tutt. Except for the colour of the hair of the last instar larva, they are almost identical in all stages. The imago is very like that from N. France, but the female has the red tinge indicative of a warmer climate.

The larva also comes close to the other French forms in having a completely orange-brown head when full grown, but if I follow Tutt's description correctly, it appears to have in all stages dorsal marks as small as those of *callunae*. This is very curious and I have no suggestions to offer concerning it, but all the other characters point to a close alliance between the races from the north and south of France, while as noted before, the former is quite close to typical *quercus* from S. England.

To sum up briefly, there are two races of this species in Britain: var. *callunae*—superficially very variable—in the north and west, and typical *quercus* (which is much nearer to the French forms than to *callunae*) in the south-east. Both French and *callunae* stock have invaded the area occupied by the latter race. Throughout most of northern France there is probably only one race, but as I have seen the larvae from a single locality only, I am not quite certain about this; neither do I know its exact range. It is therefore referred to above simply as the 'N. France form'. The two races known from the south of France are very similar to each other and seem to be connected with the N. France form.

Tutt, "Natural History of British Lepidoptera," Vol. 3, p. 34 et. seq.
Bacot. "Entomologist's Record and Journal of Variation," 1896.
Bacot and Warburg, "Ent. Rec." 1901.

***Aphomia gularis*, Zell.**

By S. N. A. JACOBS.—*Read 12th July, 1934.*

My attention was first drawn to this species by Mr. S. Wakely, who took a male specimen in Finsbury in July, 1932, and who in December of that year received a female specimen from Upper Norwood. My interest was further stimulated by finding a fresh male myself, sitting on the frame of an office window in Fen Court the following July, 1933. So far the insect has been considered rare in this country.

Some weeks after my capture of the male *gularis*, while walking down Eastcheap, I noticed a Phycitid moth, which was new to me, in the window of a dried fruit sale-room and on going inside to secure it, I found another specimen. These were kindly identified by Mr West as *Myelois phoenicis*, Durr., and the determination was confirmed by Mr Tams. I mention them because they gave me the idea that an exploration of some of the dried fruit warehouses might produce some interesting material, and I was fortunate in that I met with sympathetic interest in the next place I visited, on showing the *phoenicis*, which was obviously different from the usual *Ephestia* and *Plodia*, to which the members of the staff were accustomed.

Further than this, the warehouse foreman was present, and seeing the larger insect I was showing, told me that his warehouse was full of moths "like young eagles" and had been each year for three years. Seizing the bull by the horns, I accompanied him to the warehouse, which was a basement and cellar, and although the light was none too good, I was rewarded by three or four *gularis* captured between a horny forefinger and thumb, useless as material, but none the less interesting as it certainly looked as though I had at least found a place where the insect was to be found with reasonable certainty, even allowing for hyperbole in the statements of my informant, both as regards size and numbers.

After this evening visit, I called at the warehouse almost daily, armed with pillboxes, and daily I secured a bag of warehouse insects, chiefly *Ephestia elutella*, Hb., *Plodia interpunctella*, Hb., with some *Tinea misella*, Z., and *T. granella*, L., and one or two *Myelois ceratoneae*, Z., and *A. gularis*.

I would here state that my first visit was during the third week of July.

I noticed that the cobwebs in the window corners were full of the desiccated remains of both *ceratoneae* and *gularis*, so that I

was rather behind the fair this year and would have to make an earlier start in the next year.

About the beginning of August, some largish olive green larvae began to appear walking restlessly over the walls and ceiling, evidently looking for quarters in which they could pupate, and as the season wore on their numbers increased until, in the latter part of September, I was able to collect about fifty or sixty larvae daily. After that the numbers declined rapidly until only a stray one or two could be seen.

The larvae apparently came from bags of Spanish Almonds, which had stood over from the previous Christmas trade, though there were also large quantities of peanuts (which I was assured harboured nothing with the possible exception of *T. granella* and an occasional *Ephestia* larva), Barcelona nuts and walnuts, neither of which seemed to produce anything. However, in conversation with the foreman, I elicited the information that in his opinion the *gularis* larvae first arrived in a consignment of walnuts from Naples, which arrived in a wet condition. Brazil nuts, being scalded before export in order to sterilise them (to prevent the repetition of the happenings with rubber, when plants were exported and the Brazilian trade spoilt), were certainly free from insects.

As the numbers of larvae began to abate, I noticed one day that many of them found their way under some wooden electric light casing that was not in use, both between the wood and the wall, and also under the capping where this was sufficiently loose to permit of the entrance of the larvae (and in this connection, I would state that, like Henri Fabre's nut weevil larvae, they seemed able to enter an absurdly small aperture).

On removing the casing and capping, I found a very large number of cocoons, and in one place where the capping had been loose, I pulled out a mass, shaped to the wire channels, some ten inches long by two inches wide by a quarter of an inch deep, of closely packed cocoons, containing about two hundred larvae. The back of the casing also, between it and the wall, produced a neat row of cocoons placed vertically side by side, both top and bottom.

The larvae taken were given rolls of corrugated straw board for pupation and they disappeared into these with remarkable rapidity, spinning up almost at once. The larvae in the cocoon masses from the electric light casing all left their homes on being disturbed, and they too resorted to corrugated straw board rolls and as I understand that larvae evicted from their cocoons are more likely to suffer from disease, I placed these separately in the bottom of the airing cupboard, where although they would be warm, they would not be unduly hot owing to the constant flow of air under the door. Moisture was supplied in the form of a slice of raw potato replaced as occasion demanded, and from these forced larvae, the first moths appeared on the 20th March of this year. At first came all males,

but after a few weeks, females came too. Six of each sex were put in a box in the hope of getting a pairing, but for a time they absolutely refused to pair though the males persisted in their characteristic wing-fannings and the females seemed restless.

Mr. L. T. Ford, to whom I had passed some larvae, succeeded in forcing imagines somewhat before mine and he had secured a pairing, so on recourse to him, I was informed that although he had not been able to get them to pair in a box, they had done so when placed in a gauze cage. My insects were accordingly accommodated in a roomy gauze cage, and with the next spell of warm weather, I was pleased to note two pairs *in cōp.* and I accordingly placed some shelled almonds, walnut kernels and peanuts on the floor of the cage, in the hope of getting fertile ova.

Amongst my *gularis* captures was a pair *in cōp.*, from which I obtained a batch of fertile eggs, and although all the larvae died at the point of spinning up, the larval-history can be reported.

The egg is horizontal-ovate usually drawn to a point at one end, very thin shelled, whitish-grey, pitted all over and also finely reticulated.

In captivity the eggs are laid for preference along the wrinkles in the skin of an almond, and here it is interesting to note that, while I have had occasional ova deposited on the floor and sides of the cage, I have not yet seen any attached to either walnuts or to peanuts, although, as mentioned later, its import into America is said to have been in Chinese peanuts, and into this country with walnuts.

The particular batch under observation was deposited on the 2nd August and hatched on the 7th August, 1933, it being exceedingly hot at the time. Other broods I have had have varied from a week to three weeks in hatching, according to the outside temperature.

The newly hatched larva is transparent ochreous-pink with amber coloured plates, and in the second instar it is similar. On each somite there are eight raised dots in two transverse lines of four, each dot emitting a longish amber coloured hair.

In the third instar the pinkish colour persists but shows a lightening between the somites; the head remains amber with dark jaws, but the plates have become dark blackish brown.

In the fourth instar the pink colour still persists but the skin begins to show somewhat dusky; head and plates shining chestnut, the face darkening to blackish at the jaws. The darkening of the skin persists in the fifth instar, head and plates remaining the same, but in the sixth, the colour has become a bluish-olive-green, and the head and plates shining blackish-brown. At the ecdysis, the colour reverts to the early pink, only becoming dark about two or three hours after the completion of the change.

The larva is now mature and it seeks a convenient spot for pupation. In the warehouse, as mentioned, the electric light casing

was a very favourite place, and it is interesting to note that they had entered the vent holes in the porcelain fuse boxes so as to fill all the inside space completely. They entered cracks in the wooden partitioning, in fact, any confined space that came their way was made to suit their purpose. In captivity, the rolls of corrugated straw board proved ideal.

Having selected its site for spinning, a fusiform cocoon is constructed of white silk; almost opaque, though somewhat loosely spun, and mixed, especially at the outside end, to some extent, with fragments of wood or other surrounding material. Having constructed the cocoon, the larva next purges itself, losing its dark colour and becoming a pale yellowish green, with a green dorsal line and head and plates light amber-brown.

For some time it remains in a semi-active state, and if the cocoon be disturbed, or submitted to undue vibration the purged larva will leave it and seek fresh quarters.

The actual brood of larvae I had under observation, whose numbers were depleted by specimens sent to the Imperial College of Science (Stored Products Department), began to spin up on the 12th November, but collected larvae spun up during the latter half of October.

The winter months are spent mostly in the larval form, cocoons of the forced larvae opened in February still contained the purged larvae, though somewhat sluggish by now. The cocoons not subjected to outside heat still contained larvae in late March, but those opened in April contained the pupa.

The ways of the larva while feeding, seem to vary considerably; those, which I raised last year, declined to touch anything but shelled almonds, and died of starvation rather than take either walnuts (with which I am told they first came to the warehouse) or peanuts (with which they are said to have entered the United States from China).

This year I am supplying my larvae with green almond fruits as well as the ripe kernels, and they seem to have a strong preference for the latter.

Mr. Wakely informs me, however, that his larvae are behaving in quite a different manner and bore energetically into any kind of nut presented to them, even trying the slice of potato supplied for moisture.

My this year's larvae still preserve their attachment for almonds, and so far are not willing to touch anything else.

The pupa is clear light amber, somewhat lighter on the ventral surface, and with an olive tinge in the wing cases. Down the back, from the collar, across the thorax, where it is less pronounced and of the general colour of the pupa, and then again strongly and unbroken along abdominal segments 1 to 4 and to the middle of 5 is a strong raised ridge, dark purple-brown shading into crimson on

the base, and this ridge is continued on the fore part of the remaining segments.

On the anal segment are two somewhat pronounced bosses on opposite sides of the extremity, and underneath is a third, somewhat less pronounced, forming roughly an equilateral triangle with the other two.

The ridge mentioned above is apparently in the nature of a suture, for on the emergence of the imago, the pupa skin splits down the centre of this keel-like process, as far as it extends down the fixed segments.

On emergence of the imago, the pupa is not extruded from the cocoon at all, the moth forcing its way through an already prepared exit, which, owing to the fusiform shape of the cocoon, efficiently prevents the entrance of other insects.

On referring to the bibliography of this insect, I find that all the authors have dealt at length with the description, but the habits are totally ignored or else are dismissed in a word or two.

The first reference to the species is "Horae Soc. Ent. Rossicae," XII. p. 74. Pl. 1, f. 26 ♂, Pl. 2. f. 27, ♀, from which plates the insect is recognisable, but sadly lacking in colour, especially in the case of the male, which is shown as sooty grey with the characteristic buffish-orange mark. This description is dated 1877, and mentions the locality as 2 ♂, 2 ♀ from Japan in the Staudinger Museum. The insect is here known as *Melissoblaptēs gularis*, Zell.

The next reference is under the name *Paralipsa modesta*, Butl., in the "Annals & Magazine of Natural History," 5th Series, IV. p. 455, where the male is described; this is dated 1879 and refers again to the Staudinger specimens.

As *Melissoblaptēs tenebrosus*, Butl., a female is figured in the "Illustrations to Heterocera in the British Museum" with description Pt. III, p. 78, pl. 60, f. 1 (1879). But here again the insect is shown as being very dull and flat, though clearly recognisable.

"Romanoff Memoires," VIII (1895) p. 474, pl. 43. f. 25, shows a somewhat dully coloured male under the name of *Paralipsa modesta*, Ragonot. Here two males are mentioned from Japan in the British Museum, also specimens from Shanghai, China, and *P. gularis* as from Bhoutan, North India.

The final reference in the older works is in a paper read by Sir George Hampson before the "Bombay Natural History Society" in 1898, and published in that Society's Journal for 1898 under the title of "The Moths of India." There is a woodcut of the female easily recognisable, and the species is known here as *Melissoblaptēs gularis*, Zell., with the habitat cited as Japan and Sikkim.

In correspondence with Mr. Meyrick, it might here be said, he pointed out, that his assertion in his handbook that *Aphomia* is monotypic, was based on the exaggerated neuration of *A. sociella*

male, and in a revision of the Pyrales, etc., he has altered his views, but as *sociella* was the accepted type of *Aphomia*, he had previously thought it better to leave it in a family to itself.

Later references to the species are to be found in the "E.M.M." 1922, Third Series, Vol. VIII, p. 191, where under date 19.vii.22, Mr. F. Laing writes "I am indebted to Mr. Raymond Wadsworth, Bourneville, for some specimens of a Galleriid moth, *Aphomia gularis*, Zell., which seem likely to assume some economic importance. They were bred about a year ago from a consignment of infested walnuts imported direct from Marseilles. The larvae are said to behave very much in the way of *Ephestia kühniella*, and to resemble that species in appearance. The wood of the boxes, in which the walnuts were packed, was bored by the larvae and cocoons built in the holes so formed. The range of the species seems to be gradually extending. Originally described in "Horae Soc. Ent. Rossicae" from Japan, it has been recorded from China, Vladivostock, India, and recently (1919) from the United States where it has done a certain amount of damage in stored peanuts."

Again in the "E.M.M." 1931, 3rd. Series, XVII. p. 59, there is a note on the species by Mr. O. W. Richards, which reads as follows: "*Aphomia (Paralespis) gularis*, Zell.—A London firm recently sent to the department of Entomology some Algerian almonds badly infested with larvae of this moth; an adult which emerged at the end of January was kindly identified by Mr. W. H. T. Tams. Zeller described the moth from Japan, and the first record from Europe was by Joannis ("Bulletin de la Musée d'Hist. Nat.", Paris, 1908, p. 277), who found it in France. More recently Le Marchand ("Bull. Soc. Ent. France," 1928, p. 307) has recorded it again from the same country. In England the moth was first found by Mr. F. Laing ("E.M.M." LVII, 1922, p. 191) who bred it from walnuts imported into London from Marseilles. There is also a specimen in the British Museum collection presented by Mr. R. E. Wadsworth; this example came from Bourneville."

This last record does not tally quite faithfully with the reference given as shown by the foregoing, but it clearly refers to the Wadsworth specimens from Bourneville.

Mr Richards continues: "The moth has become well established in the Southern United States of America (California) whither it was imported with Chinese peanuts (De Ong, "Journal of Economic Entomology" 1919. p. 407, and the same author notes that *Microbracon hebetor*, Say (*Habrobracon juglandis*, Ashmead) occasionally parasitizes the larva (De Ong, "Journ. Ec. Ent." 16. 1923, p. 550). *A. gularis* is also widespread in the Orient, and some additional information is given by Zacher ("Die Vorratts-, Speicher- und Material-schädlinge," Berlin, 1927, p. 429). The larva appears to eat most kinds of stored products including cereals, nuts, and fruits."

Suggestions for the Study of the Micro-Lepidoptera.

By Hy. J. TURNER, F.R.E.S., F.R.H.S.

Read 27th September, 1934.

What we understand at present as comprising the "Micros" are the four large Groups, the Pyralidina, the Psychina, the Tortricina and the Tineina.

The great drawback to the study of these smaller insects is the almost complete absence of easily available figures by which an approach to an identification can be made. There are figures, and there are descriptions, but so scattered in the literature, that it is almost like the search for a "needle in a bundle of hay." For descriptions we have the much abbreviated paragraphs of Meyrick's book with its useful identification tables. But as these mites are extremely prone to local variation, the tables are as often useless, as they are useful. The members of our Society are particularly fortunate, however, in having a practically complete collection of the imagines of these Groups to consult. A collection, moreover, which has been collated recently with the great collections of our British Museum.

In this study one must remember that the students are few and that humans make faulty observations which, unfortunately, have the demerit of getting repeated *ad lib.* Thus one should not take book statements as absolutely correct, but run over the matter again and verify before proceeding to base further research on those unverified statements. Dates of appearance, periods of the different stages, details of oviposition, of pupation, of hibernation and of distribution must be verified and particularly so the foodplants. Such records as *Tortrix viridana* larvae in numbers on "Butcher's Broom," certainly not its foodplant, and a tree-frequenting species of *Coleophora* on a geranium are examples.

Let it be an axiom that Field work and Library work run together.

The approach to a knowledge of the Micro-lepidoptera is different from that of the Macro-lepidoptera. A knowledge of the species in the latter is commenced as a general rule by the capture of the imago, while with the former it has begun in the majority of cases by observation of the depredations effected by the larvae on the

vegetation. Hence with a large number of the *Nepticula*, *Coleophora*, *Lithocolletis*, *Gracillaria*, etc., it has been only by indications of larval working that the species have been discovered. Thus of a very considerable majority the life-history is more or less known.

Still there remains a fair number of species, including mostly very local, rare and casual species and those which have been separated in recent years by their genitalic structure, whose life-histories have not yet been fully worked out.

Taking Meyrick's "Revised Handbook of the British Lepidoptera" as a basis, I have appended a List of all the species in the four groups of which the larvae are unrecorded by him. At the same time it must be noted, that many of those, of which the food-plant has been ascertained, have never had their detailed life-histories described.

DESCRIPTIONS.—"Ad hoc" descriptions are of very little use. Every description should be comparative. We note the prominent characters of a form new to us and involuntarily compare it with those forms which it more or less resembles and which we already know. Then why in giving a description for others to use, should we omit the details of the differences, which had been so useful to us in our search? Similarities should be detailed as exactly as differences. 'Tis by the similarities that we gather species into the conventions we call genera. 'Tis by the differences that we segregate individuals into the lesser groups we call species, which are more or less identical forms congenital in origin.

LIFE-HISTORIES.—What should be included in a Life-history? We have various examples. Tutt in his "British Lepidoptera," followed the model of Scudder in his "Butterflies of the Eastern United States," and gave an even more detailed and prolix account of all the four stages, occupying many pages of print. (The study of the sexual structures had hardly then begun and there was no reference to them in Tutt's writings.) On the other hand the Life-histories in the works of Stainton and Meyrick, more than 50 years apart, exhibit descriptions of quite the opposite character, most meagre in the extreme; they give in the fewest possible words the critical distinguishing characters of the typical form of the imagines only, and possibly a food plant of the larva, with the month of appearance. All this often described in less than a dozen lines of print.

What is wanted is an adequate and useful account of each species and of its variation, but not all possible anatomical and microscopical details.

OVUM.—We want to know how, when and where the eggs are laid, the length of the ovum stage, the number of ova laid, the comparative description, the shape and size of the egg, and possibly the changes of colour.

LARVA.—The average date of hatching of the ova should be

recorded; a comparative description of the larva in each of its stages; the number of ecdyses; length of each period between the changes; the usual, most acceptable food and any natural substitutes; if hibernating, when, where and for how long; date of pupation; approximate total length of larval stage; any special habit of the larva such as mining, case-bearing, gall-making, covering with excreta, cannibalism, resting position, web-making, leaf-rolling and twisting, etc.; the number of broods in a year; whether the larval period can be prolonged or shortened.

Note.—It must be remembered that similarity of larval habit will produce a convergence of outer structure and appearance on the larvae of quite distantly related species. For instance, a leaf-mining habit will produce a flattened shape of the whole body, a skin mostly devoid of colour, few or no markings, chitinous plates on the head and anal segment and often on the thoracic segments, more or less atrophy of the usual abdominal claspers, almost complete atrophy of skin appendages such as tubercles, warts, bristles, setae, etc., which may be present in allied non-mining species.

Thus only in a very general way can the characters of many of the larvae of Micro-lepidoptera be used for classificatory purposes.

PUPA.—How, when and where pupation takes place; details of the cocoon or pupal chamber; time larva remains in cocoon before the change; average length of stage; approximate time of emergence; can the emergence be delayed or accelerated; general shape of pupa and particular development of the pupal legs, antennae, palpi, etc.

IMAGO.—It seems scarcely necessary to dilate on this stage, but perhaps we might mention a few special points—the preparation for emergence, time and length of sexual union, and sexual attractiveness—; besides the usual comparative description of body and appendages, size, shape, colour and other necessary characters which are features of every adequate description.

VARIATION.—Besides the salient points in the variant description it must be stated whether the varietal form is isolated or sporadic; attached to certain localities; attached to a peculiar foodplant; does it form a small percentage in the colony?, a race; does it predominate almost exclusively in a colony?, a subspecies; the cause or suspected cause of such variation; is it subject to the phenomenon of protective resemblance?; are any forms pathological?; the effects of scarcity, abundance, or state, of the foodplant; etc., etc., and where possible, the behaviour of each variation in breeding, *i.e.*, as dominant or recessive.

NOMENCLATURE.—In the early days of this Society the famous "Doubleday List" was in use. Then in 1880 the late Richard South compiled a list from the great continental catalogue of Staudinger published in 1871. This has remained in use until almost the present time, for but few used Meyrick's revision of 1896. The

new "Revised" edition of Meyrick is now the only comprehensive work in the English language and one must perforce use it and consequently use its nomenclature and arrangement, in spite of various errors, deficiencies and personalities, to which some of us have rather forcefully called attention. Not only that, but the collection in the Society's cabinet is now arranged in accord with Meyrick's book.

Many points have been omitted in these brief remarks, which most workers will be able readily to supplement.

Appended is a List of species, taken from Meyrick's "Revised Handbook," of which the life-histories are very deficient, or unrecorded.

There is also a List of Books on the Microlepidoptera in our own language and another List of those published on the Continent on the same groups.

LIST OF TEXT BOOKS ON THE MICRO-LEPIDOPTERA IN THE ENGLISH LANGUAGE.

- Wood (1839), "Index Entomologicus." All figured, v. good. No descriptions (referred to Stephen's "Illustrations").
- Humphries and Westwood (1845), "British Moths and their Transformations," Vol. II. All figured, mainly bad.
- Stainton (1854), "Insecta Britannica. Tineina." Good description of all. 10 plates, illustrating each genus.
- Stainton (1857), "Manual of British Butterflies and Moths," Vol. II. All briefly described, but few figured.
- Wilkinson (1859), "The British Tortrices." Good descriptions of all. 4 plates, illustrating each family.
- Stainton (1855-73), "The Natural History of the Tineina," Vols. I.-XIII., each describing, and well illustrating in colour, 24 species.
- Morris (1872), "British Moths," Vols. III. and IV. Extremely meagre description and poorly coloured illustrations of all.
- Leech (1886), "British Pyralides." Very poor descriptions. Fairly good figures of all.
- Meyrick (1896), "Handbook of British Lepidoptera." Descriptions of all. Very brief.
- Tutt (1899, 1900, 1906), "A Natural History of the British Lepidoptera," Vols. I., II. and V. Very full accounts of the Nepticulids, the Psychids, and about half the British Plumes. Difficult to wade through. No figures.
- Barrett (1904-7), "Lepidoptera of the British Islands," Vols. IX.-XI. Ad hoc descriptions and useful information on habits, occurrence and variation of all the Pyralides and Tortrices, with coloured plates of all.
- Meyrick (1928), "Revised Handbook of British Lepidoptera." Very abbreviated descriptions of all. No figures.

LIST OF CONTINENTAL WORKS WHICH MAY BE CONSULTED FOR
THEIR FIGURES.

- Hübner (1796-1830), "Sammlung europäischer Schmetterlinge," Vols. VI., VII., VIII. and IX. Excellent coloured illustrations of the majority of British species.
- Duponchel (1831-42), "Histoire Naturelle des Lepidoptères," Vols. VIII(2)., IX., X., XI., and Sup. IV. With weak descriptions but excellent figures of all in colour.
- Fischer v. Röslerstamm (1834-43), "Abbildungen-Microlepidopteren." With extremely fine illustrations of numerous species in colour.
- Herrich-Schaeffer (1843-56), "Systematische Bearbeitung der Schmetterlinge von Europa," Vols. IV.-VI. A supplement to Hübner's work, with excellent coloured figures.
- Millière. (1859-74), "Iconographie," Vols. I-III. Many beautiful illustration of Life-histories in part,
- Heinemann. (1863-77), "Schmetterlinge Deutschland," Vols. II and III. Excellent descriptions and tables only.
- Spuler (1910), "Schmetterlinge Europas." Numerous good figures (Is a revised edition of Hoffmann).

CATALOGUES WHICH MAY BE CONSULTED FOR REFERENCES.

- Staudinger (1901), "Catalog der Lepidopt. Palaearct. Faunen," Part II. An indispensable book of reference.
- "Lepidopterorum Catalogus," by various authors: incomplete.
- Already issued—Part 6. Adelidae, Micropterygidae, Gracilariidae.
- Part 10. Tortricidae.
- Part 17. Pterophoridae, Orneodidae.
- Part 19. Hyponomeutidae, Plutellidae, Amphitheridae.
- Part 34. Psychidae.

LIST OF SPECIES OF THE MICRO-LEPIDOPTERA WHOSE LIFE-HISTORIES
ARE UNRECORDED.

(Compiled from Meyrick's Revised Handbook.)

PYRALIDINA— <i>Phycitidae</i> .	? <i>C. pascuellus</i> , L.
<i>Hypochalcia ahenella</i> , Hb.	? <i>C. ericellus</i> , Hb.
<i>Heterographus oblitella</i> , Zell.	? <i>C. silvellus</i> , Hb.
<i>Myelois cirrigella</i> , Zinck.	? <i>C. craterellus</i> , Scop.
<i>M. phoenicis</i> , Durr.	? <i>C. myellus</i> , Hb.
	<i>C. margaritellus</i> , Hb.
<i>Crambidae</i> .	<i>C. furcatellus</i> , Zett.
? <i>Crambus hamellus</i> , Thunb.	<i>C. latistrius</i> , Haw.
? <i>C. uliginosellus</i> , Zell.	<i>C. contaminellus</i> , Hb.

C. poliellus, Treit.
C. lythargyrellus, Hb.
Platytes alpinella, Hb.

Pyraustidae.

Diasemia litterata, Scop.
D. ramburialis, Dup.
Margaronia unionalis, Hb.
Pyrausta flavalis, Zink.
Scoparia alpina, Stain.
S. pallida, Steph.
S. basistrigalis, Knaggs.
S. ambigualis, Treit.
S. ulmella, Knaggs.

TORTRICINA—*Phaloniidae.*

Phalonia luridana, Gregs.
Chlidonia subbaumanniana,
 Wilk.
Cnephasia genitalana, Pierce.

Eucosmidae.

Eucosma obscurana, Steph.
Argyroplote schulziana, Fabr.
Hemimene aeratana, Pierce.
Pammene germanana, Hb.

TINEINA—*Gelechiidae.*

Psamathocrita osseella, Stain.
Aristotelia unicolorella, Dup.
A. suffusella, Doug.
A. elongella, Hein.
A. servella, Zell.
A. lutulentella, Zell.
Gelechia mundella, Doug.
G. senectella, Zell.
G. desertella, Doug.
G. politella, Stain.
G. distinctella, Zell.
G. boreella, Doug.
Phthorimaea strelitzella, H.-S.
P. blandulella, Tutt.
P. maculiferella, Doug.
P. junctella, Doug.
Sophronia semicostella, Haw.

Blastobasidae.

Auximobasis normalis, Meyr.

Oecophoridae.

Schiffermuelleria tripuncta,
 Haw.
Borkhausenia subaquilea, Stain.
Depressaria pimpinellae, Zell.
D. hepatoriella, Zell.

Heliodiniidae.

Pancalia latreillella, Curt.

Elachistidae.

Elachista kilmunella, Stain.
E. collitella, Dup.
E. subalbidella, Schlag.

Hyponomentidae.

Argyresthia semifusca, Haw.
Zelleria fasciapennella, Stain.

Coleophoridae.

Coleophora graminicolella,
 Wocke.
C. squamosella, Stain.

Plutellidae.

Acrolepia betulella, Curt.

Lyonetiidae.

Opostega spatulella, H.-S.

Tineidae.

Tinea confusella, H.-S.
T. albicomella, H.-S.
T. simplicella, H.-S.

Adelidae.

Nemophora schwarziella, Zell.
N. pilella, Fabr.

The Psychina are omitted.

The Micro-Lepidoptera.

By S. N. A. JACOBS.—*Read 27th September, 1934.*

In approaching the very large subject of the Micro-Lepidoptera, we of the younger entomological generation must do so in all humility, for although there was a distinct lull in the interest taken in these insects during the past generation, the fathers of the elder members of the present generation, and the grandfathers of the younger members turned the greater part of the ground we are now working in no uncertain manner, and what chiefly remains for us to do is to co-ordinate and sift the work done by our elders, so that when the opportunity offers, their observations, coupled with anything we may have been able to add, may be collected into a publication which may rank as a standard work and complete the task so well begun by Mr. Stainton in his "Natural History of the Tineina."

Seeing that the number of the endemic species considered as "Micros" to-day is about 1332 out of our total of about 2147 species, it is obvious that the whole cannot be taken into consideration in one evening.

Meyrick mentions the census of species as Pyralidina 197 species, Psychina 24, Tortricina 337, Tineina 680, Nepticulina 71 and Micropterygina 19. To these may be added some species newly added to the British list including *Aphomina gularis*, Zell., *Phlyctaenia fulvaris*, Hb., *Coleophora vacciniella*, H.-S., *Nepticula decentella*, H.-S.

Of the Groups mentioned it is proposed to deal only with the Tineina, Nepticulina and Micropterygina, choosing possibly the easier course, as these are the satisfactory groups, while the Pyralidina and Tortricina are still in a far from satisfactory state, and much specialized work waits to be done before they are reduced to a really fit state for amateur handling, since any systematic work requires the attention of entomologists with free access to all exotic species as well as the endemic species. In the Tineina, the larval habits vary very considerably, and the majority may be said to feed internally, either in seed-heads, stems, or in mined leaves. Many more feed within a protective gallery of silk, frass and food particles, while in the case of *Goniodoma limoniella*, Stain., a floret of the Sea Lavender is used, and the large genus of *Coleophora* uses elaborate cases, varying widely with the species, some of which are very striking.

On the whole, the Tineina may claim recognition from mankind as being of fair economic importance, for their small size is in many cases compensated by numbers, and where their food is of use to man, they incur his wrath in proportion to the damage they do.

The House Moths *Endrosis lactella*, Schiff., and *Borkhausenia pseudospretella*, Sta., perhaps are the best known of the deleterious species followed by the several indoor species of *Tinea*: *pellionella*, L., *biselliella*, Hml., *fuscipunctella*, Haw., which specialize in animal and vegetable textiles, and *Tricophaga tapetzella*, L., which inhabits stables and specializes in the flannel harness linings and coach upholstery, with a special penchant for green baize such as gardener's aprons, and the less common *Tinea misella*, Zell., which attacks vegetable fibres.

Tinea granella, L., when present, usually appears in large numbers, doing considerable damage to grain and other vegetable food products, but many outdoor species come under the notice of the farmer and gardener; the Currant Clearwing, *Synanthedon tipuliformis*, Clrck., the Black Currant Bud Moth, *Lampronia capitella*, Clrck., and the Raspberry Moth, *L. rubiella*, Bjerk., and the thoroughly cosmopolitan *Plutella maculipennis*, Curt., attacking Crucifers of all kinds. Then we have *Platyedra malvella*, Hb., feeding, often plentifully, in the seeds of Hollyhocks; and *Sitotroga cerealella*, Olvr., doing considerable damage in stored cereals, the larvae clearing the entire contents out of the selected grain.

Many of the families are quite harmless in their mode of life, feeding in the spun shoots of low plants, or mining leaves, often showing striking habits, such as the spirally twisted grass larval habitat of *Brachmia rufescens*, Haw., where two grass blades are drawn together and then twisted spirally the one about the other and a cylindrical chamber formed, which is lined with silk, and from which the larva goes out to feed.

The cases of *Coleophora* are worthy of a paper to themselves, so varied are they, but the general principle is for the larva to construct a case which contains the hinder parts of the larva, while it walks on the six true legs (although usually 14- or 16-legged) carrying the case vertically or dragging it behind according to species. When feeding, the front end of the case is attached by means of silk to the surface of the leaf or seed head, and thus protected, the larva proceeds to burrow into its food. If on a leaf, it eats the flesh from between the upper and lower skins, making an irregular blotch of a size conveniently reached without removing the last segment from the case.

These cases are usually made from the skins of devoured leaves, seed pods, or silk mixed with frass and food particles, and the after end has a valve-like opening so that while the larva may extrude the anal segments for the purpose of defecation, no insect enemy is able to enter by the back end of the case.

The feeding habit of *Lithocolletis* is again distinct and constant; the young larvae mine into the leaf, first separating the top (or bottom according to species) skin of the leaf from the flesh (and here it should be noted that each species is constant in its choice of top or bottom), and proceeds to line the inside of the skin with silk, systematically across and across from one end to the other of the patch, which is usually oblong, though it is oval in some cases. This silk contracts, puckering up the skin, and causing the fleshy side of the chamber to arch away from the skin, forming a snug retreat in which the larva passes its whole life, eventually pupating within the mine; the summer broods merely being attached by the cremastral hooks to the silk of the skin side of the mine, the spring brood enclosed in a silken cocoon, usually closely woven and fusiform. There is one exception to this habit among the British species, and that is *L. messaniella*, Zell., which, when feeding in the leaves of the evergreen oak, deserts the leaf and pupates in a more sheltered spot, for the leaves, being retained through the winter, would be exposed to the rigours of the biting winds of January and February, and while the silken cocoon could withstand the ordinary winter cold on the ground, the bitter cold of a frost-laden North-east wind must prove fatal to the pupa within.

Some of the species pupate in November, while others remain as larvae in the cocoons through the winter, such as *L. cerasicolella*, H.-S., which pupates only a short time before emergence.

Leucoptera, H.-S., (*Cemiostoma*, Zell.) species, including the well-known *L. laburnella*, Heyd., hatch from the egg and form a short serpentine mine, usually about half an inch long and thread-like, and they then settle down to devouring the flesh between the skins of the leaf spirally, that is, eating around and around their cavity thus enlarging it as they go, and leaving a black spiral of frass inside to mark their progress, but here the habit is not constant, for *Lithocolletis scopariella*, Zell., feeds inside a broom twig. When full fed, the larva leaves its leaf or twig, and forms a white fusiform cocoon usually on the bark of the tree, and under a slight web of white silk.

Cerostoma feeds under a slight web on the leaves of trees, etc., but the cocoon, which is usually spun in concealment on the ground, on fallen wood or under a stone, is of characteristic shape, being somewhat like the "forage cap" of the Boer War.

Hyponomeuta is another interesting genus, the larvae of most species feeding under a dense web in colonies, leaving their web as the food is exhausted and making another. They finally pupate in a cluster of cocoons under the last web, and it is indeed remarkable how the moths manage to leave the web, in nearly all cases without being caught up and either crippled or at least rubbed, for no prepared exit is apparent.

The *Nepticula* mine in two ways, the common way being a

serpentine mine between the skins of a leaf ending in a chamber large enough to hold the mature larva, from which it escapes by making a semi-circular cut at the forward end about where the skin joins the flesh. The other form is an irregular blotch, varying in extent according to the thickness of the leaf, and from this the larva escapes, again through a semicircular marginal cut. It is a curious point that, at any rate in captivity, these larvae, although they feed singly in their mines, (though sometimes there are two or more mines in a leaf), and are all but legless, are apt to collect together and spin their cocoons in small colonies. The cocoons are of dense silk, brownish, flat, and usually oyster-shaped.

Of the *Micropterygina*, the *Hepialidae* are as well-known in their habits to those who have dealt with the Macro-Lepidoptera, as to the Micro-Lepidopterists, whose property they really are. They are closely related to the most primitive of the Lepidoptera, coming just later than *Micropteryx* and *Eriocrania*, which families possess biting mouth-parts, and the imagines of which feed on pollen grains. The larvae of *Eriocrania* usually live in large blotch mines of irregular shape, while those of *Micropteryx* feed on Liverworts in damp woodland.

The spectacular "Longhorns" or *Adelidae*, live as larvae in a large flat case of two dead leaf fragments, trimmed more or less oval at the ends and attached by the edges, the larvae feeding on vegetable rubbish in woodland.

It is good to note that there are many members of the younger entomological generation, who are now paying attention to the Micro-Lepidoptera, and when the ground ploughed by their seniors has been harrowed, they will have learnt some of the painstaking thoroughness of their elders, and will be fitted to carry on the work which was of necessity left undone.

There are also, of course, constantly appearing new species to our fauna owing to the more rapid method of transport, and although intentional introduction is of course to be most rigorously discouraged, new arrivals provide the entomologist with a good chance for practising his powers of observation and deduction; exotic species very often alter their habits when entering a new country, as witness *Blastobasis lignea*, Wals., which in its native Australia is something of a pest in dried skins, but here seems to be so far a harmless feeder in outdoor rubbish.

Notes on Micro-Lepidoptera.

By S. WAKELY.—Read 27th September, 1934.

Mr. S. Wakely exhibited over a hundred species taken during the current year and his Notes which follow refer to those of particular interest.

Starting with *Aphomia gularis*, Zell.; Mr. Jacobs gave me a liberal supply of larvae last autumn, which were mostly full-fed. They pupated in pieces of cork and small rolls of corrugated paper, and I noticed the cocoon was very tough. The first imago to emerge was a male—on the 2nd of May, followed the next day by a female. These paired the same evening, and ova were observed on the 6th. The eggs were laid in irregular batches, and were deposited in crevices in cork as well as in the open. Larvae were first noticed on 15th May, and they seemed to prefer shelled almonds at first, but when larger were not so particular and attacked walnuts, brazils, and peanuts with equal vigour. During July full-fed larvae were observed burrowing into the cork, and the first emergence of this brood was on the 3rd of August. At this date some of the larvae were still not half grown, and up to the present (27th Sept.) less than a dozen imagines have emerged. One pairing took place, ova were laid, and young larvae were seen a few days ago.

To pass on to other species; the *Pterophoridae* (Plumes) are of great interest. Having the good fortune to be in the Isle of Wight during August, I was anxious to find imagines or larvae of some of the local plumes to be found there. My first trip was to Freshwater after *Alucita spilodactylus*, Curt., which occurs there among its food-plant, *Murrubium vulgare*, L. This plant I found very local, but empty pupa-cases were to be seen in numbers on the leaves. A diligent search was rewarded by finding minute larvae in the heart of the growing buds. As I had some plants growing at home, some of these were taken, and the larvae were extracted and transferred successfully. These should feed up next spring. In addition several pupae were found and, more surprising still, full-fed larvae. Two moths which emerged from these are shown.

Three specimens of the rare *Pselnophorus brachydactyla*, Tr., are shown. This local insect occurs in Gloucestershire, these particular ones being kindly sent me in the pupa state by Mr. T. Bainbrigge-

Fletcher. Some ova of the same species were sent to me later, laid on leaves of the Wall Lettuce, *Lactuca muralis*, Coss., which is rather a local plant around London. The ova were laid on the undersides of the leaves, and I counted one hundred on a single leaf. I don't think these were all fertile, but the young larvae on hatching, quickly defoliated my growing plants, and it was quite by accident I found they would eat the leaves of Nipplewort (*Lapsana communis*, L.), a very common plant around London. Ordinary garden lettuce was also accepted by the young larvae, but I doubt if the larvae would thrive on this for long. My larvae took up positions for hibernation quite early in August, and I hope to see them again next spring. They are barely a quarter of an inch long, and are sheltering in dead leaves. Another local species, *Pterophorus carphodactyla*, Hb., was searched for in the Isle of Wight. It is to be found on *Inula conyza*, D.C. (Ploughman's Spikenard), and occurs on the southern slopes of the Downs stretching from Arreton to Bembridge. I found very small larvae in the centre of crowns of the first-year's plants. The heart of a plant—from which next year's flower-spike would grow—withered and died from the attack of the larvae, but as this takes some time the larvae apparently feed on happily under the dying crown. The plant seems to sprout again in several places later, giving the larvae a chance to move its quarters when the food gives out. Once the plant has flowered, it dies. One root, with many crowns, some of which showed signs of the presence of larvae, was taken home by a friend of mine, and he was surprised to find a moth had emerged a few days later, and within a fortnight seven specimens had emerged from this one root. Several roots taken by myself have failed to produce a single imago, and no doubt there is only a partial second emergence of this species in late August and September. Both Dr. Blair and Mr. Jacobs have also bred this moth during August, but these larvae were taken in the flower-heads (gathered at Eynsford, Kent). The first emergence is in June. The specimen shown was taken flying, after dark, on the 19th of August.

Agdistis bennetii, Curt., occurs on the salterns among *Statice limonium*, L. (Sea Lavender), and the young larvae may be taken in scores by picking the flowers in August and shaking these over a sheet of paper. My specimens came from Burnham-on-Crouch, Essex, and Shalfleet, Isle of Wight.

Both *Lozopera* (*Conchylis*) *francillana*, Fb., and *Lozopera dilucidana*, St., were bred in numbers from stems of wild carrot and parsnip respectively, the former stems producing a few specimens of *Phalonia zephyrana*. These showy species are seldom seen and must be of very retiring habits, as the two former, at any rate, occur in great numbers. The dead stems were collected in the winter and spring.

The specimens of *Tortrix viburnana*, Fb., are interesting inasmuch

as the four lower ones are the saltern form, which is much paler than the normal type, of which one is also shown. I bred these from larvae feeding on *Artemisia maritima*, L., and *Statice limonium*.

One specimen of *Evetria turionana*, Hb., a local insect, was taken at the Westerham Field Meeting, together with two specimens of *Roeslerstammia exalebella*, Fb., another species worthy of special note.

A visit to some waste land at Elmers End on the 13th July, provided me with a series of *Eucosma foenella*, L., the "Goose-neck" Tortrix of Stainton, quite a good caricature of a goose's head and neck showing on the forewing. This was flying freely at dusk around its foodplant, *Artemisia vulgaris*, L. Several other species were taken at the same time and place, namely *Pterophorus septodactyla*, Tr. (*lienigianus*, Zell.), *Argyroploce striana*, Schiff. and *Hemimene saturnana*, Gn.—rather a surprise to take such a mixed bag so near London.

Two very common species were bred from a bird's nest given me by Mr. T. R. Eagles, *Endrosis lactella*, Schiff., and *Borkhausenia pseudospretella*, Stain. They are both common house moths, and I was hoping to get something better.

Larvae of *Argyresthia goedartella*, L., were common in the spring in the bark of birch trees. They congregate in colonies for pupation, and the Woodpecker takes a toll of them and incidentally gives away their whereabouts to the observant entomologist. At Box Hill a ball of paper was found forced into a hole in a birch tree. By chance a larva was observed on this, and upon extraction the paper was found to be full of holes which the larvae had bored. Several score of the moths—*Argyresthia goedartella*—were bred from this rather unusual find.

At the Bookham Field Meeting several oak leaves were found containing small larvae which had mined the leaves in large blotches—in some cases the whole area of the leaf was mined, the larvae feeding under the top semi-transparent skin. Mr. R. Adkin named the species by this typical habit of the larva—*Acrocercops brongniardella*, Dbldy., a small series of which I bred.

A nice capture was *Monopis weaverella*, Scott, a species very near *Monopis rusticella*, Hb., but distinguished by the white tornal mark. This was taken at Selsdon, Surrey.

Tinea parasitella, Hb., and *Tinea cloacella*, Haw., were bred in numbers from a dry woody fungus collected at various places. The latter is very close to *Tinea granella*, L., in appearance, but *T. granella* is a warehouse moth. This species feeds in the larval state on corn grains of various kinds, and I found a colony recently in a bag of bitter almonds at a grocer's shop. Mr. Jacobs gave me some feeding on ergot of rye, and these fed readily on peanuts, the soft shells of which were much appreciated by the larvae for pupating in. Some years ago, I took this species in the Isle of Wight, together with

Monopis crocicapitella, Clem. The larvae in this case were feeding on some printer's old inking rollers, which were made of a mixture of glue, black treacle, etc.

I have included a pair of the Clearwing, *Synanthedon* (*Aegeria*) *flaviventris*, Stdgr., with the moths shown, and these were bred by Mr. Jeffery, who found the willow twigs with galls at Parkhurst Forest in the Isle of Wight.

Two specimens of willow stems with galls are exhibited, and the larval workings can be plainly seen. This species is two years in the larval state, and I understand all the English specimens are taken every other year. This means that it will be no use taking stems with galls this winter, as I believe the first-year larvae are impossible to rear if the twig is cut. This fairly recent addition to the British List of Lepidoptera is very local, but possibly it will be found well distributed if properly searched for.

An Anal Comb in a Micro-Lepidopterous Larva.

By E. A. COCKAYNE, D.M., A.M.—Read 27th September, 1934.

While trying to identify, for Mr. Hugh Cott, larvae taken from the stomachs of frogs and toads, I found one with an anal comb. This larva, discovered in the stomach of a toad captured at Possil, near Glasgow, on 19th May, 1933, is 16·5mm. long and has a complete ring of biordinal, alternate long and short, crochets on each ventral proleg. I suspect it belongs to the *Tortricina*. The comb lies above and behind the anus on the under surface of the anal flap, and consists of eight rather thin-walled light brown hollow tubes united to form a thin plate; beyond the plate each tube becomes narrower and continues as a solid black-brown pointed spine, half as long as the hollow part. The spines diverge slightly and the outer ones are the shortest. The comb, which lies with the spines pointing backwards when at rest, is attached only at its base and can be rotated so that the spines point vertically downwards and finally forwards, in which position they are close to the anal opening.

It is so similar to the well-known anal combs found in the larvae of all *Grypocera*, that I think it must serve the same purpose. The following notes are taken from Tutt's "British Butterflies."—The comb of *Syrichtus* (*Pyrgus*) (*Hesperia*) *malvae*, L., is ·6 mm. long, narrower at the base and spreading to the edges of the spines, each of which seems to arise quite at the base, a rib running down the comb from the base to each point. The comb of *Adopoea* (*Thymelicus*) *acteon*, Rott., is ·4 mm. \times ·3 mm. and has twenty short teeth." The figure (Vol. I, Pl. xviii.) shows that it is very like the comb of *Carterocephalus palaemon*, Pall., a drawing of which was also handed round. The two drawings are on the same scale, and since the full grown larva of *palaemon* is 23·8 mm. long and the Microlepidopterous larva is 18·5 mm. long the proportionate size of their combs is much the same. I think the comb of *palaemon* consists of a series of thick-walled hollow tubes, rather than solid rods as Tutt says they are in *malvae*.

Frohawk ("Natural History of the British Butterflies," Vol. 2, p. 187) gives a graphic description of the use of the comb of *Ochlodes venata*, Bremer and Grey. (*Angiades sylvanus*, Esp.). Just previous to the ejection of the excrement the larva crawls backwards along

its abode until its extremity is either at or slightly protruded beyond the tube in which it lives, it then raises its anal segment, elevating the flap or lobe, and evacuates the faeces, which remain adhering to the anus. The comb is then brought down to the rim of the orifice and remains so fixed for a moment or two, as if to obtain a firm pressure with the tips of the tines, then, apparently with considerable power, it is suddenly released; spring-like the comb flies up with a violent jerk, casting the pellet with remarkable force in an upward direction, when it falls to the ground at a distance of two feet six inches to three feet away.

Jordan in a 'Note on the larva of *Somabrachys*, Kirby' ("Novitates Zoologicae," XVI, 1909, 16, 331) says that the position of the genus, which is found in North Africa and Palestine, is doubtful though it is usually placed in the *Megalopygidae*. He goes on to say that in examining this larva, which is like a *Zygaenid*, he found an organ he had not previously found in any other kind of caterpillar, and gives the following description of it.

'On the upper wall of the anus, and ordinarily concealed from view, there is a kind of fork or rake with three or four tines. This rake is black-brown. It lies flat on the upper wall of the anus or rather on the lower side of the broad lobe which covers the anus from above, and its tines are directed backwards. All examined had three or four tines, this variability being observed in specimens found together. The tines are apparently always, practically of equal length. They vary in shape inasmuch as some are pointed and others truncate and dentate. The insect can so move the organ that it is directed downward. We ascertained its use by observing the living larva under a lens. When the faeces leave the anus the rake is employed to push them outside and give them a final jerk, which sends them rolling off the anal segment." The figures show that the tines are long, like those of the *Microlepidopterous* larva, but the proximal part of the comb is shorter than in either of the other types of comb.

NOTE FROM J. C. F. FRYER.

We have used the anal comb in *Lepidopterous* larvae chiefly for distinguishing *Codling* Moth larvae from those of foreign *Tortricids* likely to be found in imported apples. The *Codling* Moth larva has no comb, whereas that of *Cydia molesta*, for instance, has.

Up to the present those larvae of Meyrick's subdivision *Tortricidae*, that I have examined, have not had combs, whereas those of his division *Eucosmidae* are usually, but not invariably, provided with combs. However I have not examined enough larvae yet to say whether an absence of the comb is characteristic of the *Tortricid* family of the *Tortricina*, but I propose to pay more attention to the matter.

Biological Notes on British Megaloptera.

By E. E. SYMS, F.R.E.S.—Read 10th October, 1934.

The Megaloptera are generally placed as the first sub-section of the Neuroptera, but by many are considered sufficiently distinct to constitute a separate Order; some authorities think that the two super-families, SIALOIDEA and RAPHIDIOIDEA, into which the Megaloptera are divided, should constitute separate Orders.

In Britain the two super-families are each represented by a single family: Sialoidea by the *Sialidae*, with two species, *Sialis lutaria*, L., and *S. fuliginosa*, Pictet; and the Raphidioidea by *Raphidia* with the four species *Raphidia notata*, Fabr., *R. xanthostigma*, Schum., *R. cognata*, Ramb., and *R. maculicollis*, Steph.

The life-history of *Sialis lutaria*, L., is well known. The adult insects are very common in the neighbourhood of ponds and slow-flowing streams, from the middle of April until July. Their flight is very slow and laboured, their dark colour making them very conspicuous in the bright sunshine. They seldom take long flights and when disturbed will crawl around the plant or stone on which they happen to be resting rather than fly away. When at rest their wings are held roof-like over their backs and in this position look much blacker than they really are. The head and mouth parts of the adult are similar to those of the larva, being formed for a carnivorous diet. I have never seen them feed; in captivity they refuse all food offered but they take drops of water from the surface of the plants in their cage. The life of the adult is very short, lasting but a few days, the longest time during which I have succeeded in keeping one alive was fifteen days; this was a male that was quite fresh when caught.

The eggs are placed upon plants, stones, etc., near water and are arranged in a single layer of about one to two hundred. The female commences by placing the first row and then stepping backwards for the next row, and so on, until the whole mass is finished; in this way the eggs first deposited are covered by her body whilst the others are being laid. The egg is a short cylinder, brown in colour, placed with its long axis almost at right angles to the surface upon which it is laid. The top of this cylinder is rounded and at its centre is a white micropylar knob. Under a lens the surface of the egg is seen to be granular and the white knob to be flask shaped.

In about fourteen days from laying the larva pushes off the top of the egg and crawls out, drops to the ground and makes its way to the water. Many of the egg clusters collected at the ponds will fail to produce larvae but in their place parasitic Hymenoptera emerge. These flies seem to do their work thoroughly, for every egg in the batch seems to be stung. When the larvae reach the

water they swim about near the surface for the first few days and then make their way down to the mud at the bottom; upon this they crawl and occasionally burrow into it. The larva is predaceous, having a large head, powerful sharp-pointed mandibles, four-jointed antennae and small eyes. Its body tapers from head to tail and when full grown is just over one inch long. The legs are long, well developed and end in a bifid claw. The abdomen consists of nine segments and from the first to the seventh these carry lateral tracheal gills in the form of five-jointed transparent setose filaments, with a single tracheal tube through each. Attached to the last abdominal segment is a long tapering tail, very similar to the lateral filaments but unjointed, and with two tracheal tubes. In the water these lateral filaments are carried curved upwards and slightly backwards. It has been suggested that they are used for swimming, but this is doubtful; when these larvae do swim the undulatory movement of the body seems to be sufficient for progression. When full-grown the larva leaves the water and crawls away to a suitable place for pupation; this is generally in damp earth or in decaying timber. There it makes a cell and rests for a short time before the larval skin is shed and the pupa disclosed. The pupa has the legs and wings free, the body is curved with the ventral surface inwards, the abdominal segments are provided with spines to keep the pupa free from direct contact with the walls of the cell. After about three weeks the pupa makes its way to the surface and there the skin splits and the perfect insect emerges. At first the wings are glossy but in a short time they become darkened and normal.

The life-history of *Sialis fuliginosa* is no doubt similar to that of *S. lutaria*, but I have never been able to obtain larvae of this insect. The flies are local, they do not occur at ponds but beside streams. Mr. F. J. Killington in the "Entomologist" for 1932, gives a very interesting account of the courtship and pairing of this insect. He says that after they have separated, the female has attached to her abdomen a spermatophore. If this also occurs in *S. lutaria* I have so far failed to observe it, although I have seen them paired.

Sialis lutaria and *S. fuliginosa* are very much alike in size and colour. The most reliable characters for separating them are:—
 (1) the number of cross veins from the sub-costa to the costa; in *S. lutaria* there are eleven, whilst in *S. fuliginosa* there are fifteen.
 (2) The position of the cross vein from the radius to the subcosta; in *S. lutaria* this meets the subcosta between the bases of the fourth and fifth subcostal to costal cross veins, and in *S. fuliginosa* between the seventh and eighth. It must always be remembered that the venation of these insects is somewhat variable, the cross veins quoted are not absolutely constant. In the male of *S. lutaria* the subgenital plate is much longer than broad while in *S. fuliginosa* it is broader than long. In both species the female is much larger than the male. *S. lutaria* is the first to appear, but their periods of flight overlap.

Though the *Raphidiidae*, are usually placed in the Megaloptera, they bear little resemblance to the *Sialidae*. The prothorax is elongate, many times longer than broad, and is carried at an angle with the rest of the body. The head is much wider than the prothorax, triangular in shape, widest in front and deflexed. This strange arrangement gives the insect a very snake-like appearance, from which arises their popular name 'Snake-flies.'

The life-histories of our four species of *Raphidia* seem to be very much alike. The eggs are deposited in May or June, in a cluster under the bark of trees; the larvae emerge after about fourteen days, make their way under the bark, feeding upon any small living creatures that are to be found in such places, and are very active, running backwards almost as quickly as forwards. When full grown they often construct a cell in the bark in which to pupate. Just before emergence the pupa, which has all its limbs free, becomes active, makes its way to the outside of the bark and crawls about until it finds a suitable place for emergence.

They all pass through the life-cycle from ova to adult in a single year, but *R. maculicollis* pupates in the autumn (November) and remains a pupa for six months, emerging in the spring; the other three winter as resting larvae, pupate in the spring, and remain as pupae for one month, before emerging.

Our largest species, *Raphidia notata* is fairly common, being found in both pine and deciduous woods, in May and June. A few years ago I took home alive a male and female of this species from Brentwood, and placed the female in a large cage with a piece of pine bark. In this cage she remained resting during the day, but at dusk became active, running and flying about. Whilst resting upon the bark she was very difficult to see, her colour harmonizing with that of the bark. After she had been in this cage three days, I introduced the male in the evening, and immediately she began calling. She raised her abdomen from the bark as far as possible, standing as it were on the tip of her toes, she vibrated her abdomen rapidly, and the ovipositor, which normally is continuous with the body, was raised at right angles to it. In this position she remained some few minutes, then the male, which was six inches away, turned in her direction and began to advance rapidly. When about two inches away, the female, which had her tail towards the male, suddenly turned, and ran to the male, their heads met and then she returned to her original position and the male again advanced. He travelled with his head well down to the bark and proceeded until his head was under the thorax of the female, between her legs, then he stopped and with a sudden upward turn of the abdomen united with her. In this position they remained for over half an hour before separating. Three days later the male was found dead at the bottom of the cage. The female spent each evening examining the bark; she thrust her long ovipositor into each crack and crevice,

many places were repeatedly examined, and when she died, seven days after pairing, two batches of ova were found. They were close together under a large scale of bark that was so close down as to require a knife to raise it. In one batch there were forty six ova and in the other thirty, making a total of seventy-six ova. These ova were cylindrical, some 2.0 mm. in length and 0.4 mm. in diameter; they were slightly curved longitudinally, the base rounded and the upper part gradually reduced and at the apex of each was a spherical knob. They were laid flat between the scales of bark. The knob is pure white and the rest of the egg pale yellow. When examined under a lens the surface is seen to be covered with a fine mesh work that divides it into hexagonal cells, these cells are largest around the knob. The ova of *R. maculicollis* are similar in shape, but only 1.2 mm. long and 0.2 mm. in diameter.

Some of the ova of *R. notata* were placed under a binocular microscope so that the hatching could be observed. This took place seven days after the death of the female. Two or three days before hatching the young larva could be seen through the thin egg-shell, the eyes and mouth parts being distinctly visible. The larva was curled so that the head was bent down on the ventral surface of the thorax, and the back of the head just below the knob. I looked for an egg-burster, expecting to find one of similar type to those of the *Chrysopidae*, but there was none. Some two or three hours before hatching there was a pulsating movement, which seemed to be centred in the prothorax, and at the same time the tail began to come up from the bottom of the egg. This caused a swelling on one side of the egg just below the knob. The swelling at last burst and the larva pushed its prothorax out first through the vent, the head and legs followed. The larvæ did not leave the egg shells for some time but they did not eat them. Eventually they made their way into the bark.

The larvae of *Raphidia* are all very much alike, the head is parallel-sided, longer than wide, the prothorax the same size as the head and covered with equally hard chitin, the meso- and meta-thorax narrower and not covered with hard chitin. The abdomen gradually widens to the third segment then diminishes to the tail. The legs are pale coloured and each ends in a bifid claw. Full grown larvae of *R. notata* are 12mm. long, of *R. xanthostigma* and *R. maculicollis* 10.1mm. long.

Raphidia notata and *R. maculicollis* are well distributed over the country, but *R. xanthostigma* is more local, being found in Eastern and Central England. *R. cognata* is more rare, being found, so far, only in Eastern England. The four species can be separated by an examination of the wings: for details see W. J. Lucas, "Proceedings South London Entomological and Natural History Society," 1927-28, pp. 34-41.

Some Lost Suburban Hunting Grounds.

By ROBERT ADKIN, F.R.E.S.—*Read 18th December, 1934.*

Those of you who are familiar with the second volume of Stainton's "Manual" must have noticed the frequency with which Lewisham is mentioned as a place where such and such a species was to be found, and it will be a matter of wonder to many who know the present-day Lewisham, how it could ever have been capable of producing such species, at any rate within the memory of living man.

I was born in Lewisham and spent the early part of my life there. At first it had no railway; that came when I was two or three years old. As I first remember it, and indeed for quite a number of years later, it was a long rambling country village, its High Street, then known as "The Village," extended from where the North Kent Railway now crosses it, for about a couple of miles, by way of Ladywell and Catford to Southend. It was bordered throughout the greater part of its length by a brook which emptied itself into the river Ravensbourne near Lewisham Bridge, and in many place along its banks grew stately elms. Farms abutted on to it at frequent intervals, interspersed with little clusters of shops, a stone yard, a couple of timber yards and a few private houses, usually with large gardens. The surrounding country was intersected by numerous lanes, generally bordered by thick hedges, and a number of connecting footpaths.

My earliest collecting was done among these surroundings, Burnt Ash Lane being a favourite hunting ground. The lower portion, that nearest to Lee Green, was bordered by dense old hedges of mixed growth and I don't think that I have ever seen Tortrices so abundant as they were about these hedges. I remember that among them we used to get *Pandemis corylana*, Fab., quite commonly; I see that I still have in my collection a couple of specimens that were taken there. Further up the lane, the part now known as Baring Road, the hedges were better trimmed but afforded a good shelter for dusking. I cannot forget the numbers of *Cidaria fulvata*, Först., we used to get there; prized by us, perhaps, more for its beauty than for its rarity. From this part a footpath led to Hithergreen Lane and about half way along it, on the left hand, was a small oak wood that was never prolific in

species but quite good enough to repay a look round on passing: and on one's right hand, overhanging a brook, were a few sallow bushes that in their season could always be relied upon to produce a good harvest of the commoner Taeniocampids. Then just opposite the end of this footpath, in Hithergreen Lane, was a long, narrow plantation, consisting largely of pine trees with mixed undergrowth, which produced a remarkably large and finely marked race of *Xanthorhoë fluctuata*, L.; and it was one of the few places where I have taken *Ptychopoda trigeminata*, Haw.

Another footpath connected these two lanes nearer their Lewisham ends, and led past the celebrated "Lee Pits," or, as we knew the spot, the "Sallow Swamp." These "Pits" consisted of a series of three or four little hollows in a field, which, in winter, formed shallow ponds, but in summer were often bone dry. They had a fairly good growth of rush and sedge, and were surrounded by a rather dense growth of bushes of whitethorn, rose, blackthorn, sallow, and so forth, to say nothing of the numerous species of flowering plants that grew there. It was a spot well known to the collectors of the neighbourhood as a small entomological paradise, but the best things I ever got out of it were a few *Miltochrista senex*, Hüb.

In the "Entomologist's Weekly Intelligencer," which was published during the years 1856 to 1861, appeared notices to the effect that "Mr. Stainton will be 'at home' as usual at 6 p.m. on Wednesday next," and on occasion such notices were varied as follows: "Mr. Stainton will not be 'at home' on Wednesday. Mr. Stainton will proceed on that evening on a collecting expedition up Burnt Ash Lane: he will be at the finger-post where the lane forks at 6.30 p.m.—Incipients who are too shy or too afraid of intruding to come to 'Mountsfield' may perhaps pluck up courage enough to meet one in a lane. Incipients are requested not to come unprovided with nets." I was very young in those days, one of the incipients in fact, and could never pluck up courage enough to join those excursions, but I learned from some of my older friends who did, that they provided very enjoyable outings and that the party worked over exactly the routes that I have been describing to you,—Burnt Ash Lane, the little oak wood, Hither Green Lane, Lee Pits, all receiving attention, and often quite good bags were made. The whole of that district is now densely built over. Stainton's estate, "Mountsfield," which was situated in George Lane which connected Hither Green with Lewisham Village, is now a recreation ground, the house and the "museum" building serving as refreshment rooms, etc., while the adjoining estate, long years in the Desvignes family, is occupied by a fever hospital. Many a mild winter's evening have I spent collecting *Theria* (*Hybernia*) *rupicaprariva*, Schiff., and such like species from the hawthorn hedges that surrounded these estates, for

they were far and away the best hedges in the neighbourhood for such things: now they are no more.

There were several other choice little collecting spots in the Lewisham district in those far off days. Right on top of the Hilly Fields were some old disused brick ponds. How long they had been out of use when we used to collect there round about 1860 I cannot say, but they were surrounded by ancient willow trees and a tangled mass of undergrowth, while in them grew a goodly assortment of reeds and rushes and other water plants. I have never seen the Water Scorpion (*Nepa cinerea*, L.) and the Boatman (*Notonecta glauca*, L.) in such numbers as they were in those ponds; Water Beetles, of several species, also were very common and there were several species of Dragonflies. The surrounding herbage seemed to have some special attraction for butterflies, for many of the commoner species were to be found there in great numbers, among them I well remember *Maniola* (*Epinphele*) *tithonus*, L., of which a form with extra spots on the forewings was not uncommon. Stainton gives Lewisham as a locality for *Acentropus niveus*, Oliv. I have little doubt that these ponds were the place where it occurred, for I doubt if there was any other in the neighbourhood where its foodplant, *Potamogeton*, grew. These ponds have long disappeared, the Hilly Fields exist at the present day only in name and their site is now covered by a small town of houses.

A footpath ran from Ladywell across the "Seven Fields" to Catford, for the greater part of its length along side the river Ravensbourne. There were many old willows, elms and so forth on the banks of the river and they provided an excellent sugaring ground. I do not remember that we ever took any great rarities there but such species as *Calymnia affinis*, L. and *Calymnia diffinis*, L., were more common than I have ever met with them since. The "Seven Fields" are now the Lewisham Recreation Ground.

Over in the far corner of Blackheath was an old gravel pit. It was well overgrown with grass and scattered bushes. It was here that Tutt took the specimens of *Crambus contaminellus*, Hüb., that led to the controversy that ended in the differentiation of *Crambus salinellus*, Tutt, from that species. This pit coming under the jurisdiction of the London County Council some years ago was soon improved out of existence, at any rate so far as any entomological collecting is concerned.

Kidbrook Lane was a footpath leading from Blackheath in the direction of Eltham. It was much like the lanes about Lewisham in that it had good hedge banks and numerous elms and other trees. It was a favourite hunting ground of our old friend and fellow member, the late "Greenwich" West. I believe he took several good species of beetles there and not a few nice species of Lepidoptera. The lane has now disappeared, its place being taken by a broad road densely built along.

Shooter's Hill Wood was a little further over in the same direction. Although it had the reputation of being a good place for moths it never appealed greatly to me, but I well remember an old cork-cutter by the name of Dyball, whom I knew very well, showing me a box full of what he called Buttons—*Peronea cristana*, Fab.—that he said he had taken there. The wood, I believe, still exists, but what its present condition may be I cannot say; I only know that buildings have approached very close to it.

Greenwich Marshes extended for, perhaps, a couple of miles along the banks of the River Thames. They were intersected in places by dykes and were partly under cultivation but there was a good deal of waste land. Along the banks of one particular dyke we used to get all the *Leucania straminea*, Treits. we wanted, while *Calamia phragmitidis*, Hüb., and most of the other commoner marsh-loving species were plentiful. On my last visit to this spot I found it occupied by an explosives factory of some sort and was promptly warned off. Further over towards the river was a large tract of waste land where burdock (*Arctium*) grew in great quantity and its stems yielded a splendid harvest of the pupae of *Ochria ochracea*, Hüb. (*flavago*, Esp.) On that land now stands the largest of the South Metropolitan Gas Company's Works; the burdocks are no more.

A little further out, and just off the lower Woolwich Road, is the old Charlton sand pit, where many good species of insects were said to have been taken in the olden days. I last visited it in 1907 when it and its surrounding woods appeared to have been little altered. What may have happened since then I do not know.

There were two places in the Lewisham district where, in the autumn, we were always pretty sure of getting two or three *Lithophane* (*Xylina*) *semibrunnea*, Haw. One was just off Blackbeath on the Charlton Road, the other right at the other end of the district at Southend. Both were heavily ivy-covered, high walls surrounding old estates. Whether either of them still exists I know not, but even if they do, I doubt if their surroundings would admit of *semibrunnea* still breeding there.

Lewisham is not the only place that has, as a collecting ground, been "improved" off the face of the earth. In 1866 we discovered Bishop's Wood, Hampstead. It was a somewhat neglected place with a broad drive right through it, bordered at frequent intervals with well-grown trees, which afforded a fine site for sugaring. I do not know that we took any great rarities there, but of the commoner Noctuae there were both quantity and variety; on more than one occasion I see that a whole page of my diary is filled by their enumeration. I once spent a whole night sugaring there and was disgusted to find that after the first two or three rounds not a solitary insect arrived at the sugar until just before daybreak and then only one or two of the commonest. We walked to Charing Cross for the

7.45 a.m. train home; having refreshed ourselves on the way by a good wash in a horse-trough on Haverstock Hill, much to the annoyance of an early policeman. The last occasion on which I visited the neighbourhood was in 1927. I had been attending a function in Hampstead and wished to pick up the road north. I was told to cross the Heath, go on past the "Spaniards" and I should find a new road, Bishop's Avenue, on my left. I had no difficulty in finding the road, it took the course of the old "ride" through the wood that I knew so well, but there was no wood left, again houses and more houses where the wood once stood.

It was in 1868 that we first visited West Wickham Wood and Shirley Heath; they were glorious collecting grounds in those days. There was no Woodside Station then, but one could go to Beckenham Junction and walk some three miles along a particularly dreary road, especially at night, to the West Wickham end of the wood; or to Norwood Junction whence the walk was a mile further but more interesting, to the other end of the wood; and this latter route was, therefore, the one most in favour. Leaving Norwood Junction, a footpath led across a timber yard and then through fields on to the Beckenham-Croydon Road, crossing which and proceeding up Stroud Green Road, the second turning (I think it was) on the left, brought one to Shirley Church, just beyond which one came to the Bishop's fence which bordered the lane right up to the entrance of the wood on the left. Good collecting was to be had all the way along this route, but the last time I was there, now some years ago, most of it was built over. The Bishop's fence was one of the few places where *Odontosia carmelita*, Esp., had occurred, and one was always hopeful that it might again be found there, but although I never missed the chance of thoroughly searching the fence, whenever the opportunity offered, it did not fall to my lot to find *carmelita*; I did, however, get a number of quite nice species from the fence at one time and another.

When it was possible, as sometimes happened on a Saturday, to make a start soon after mid-day, the round would be from the Station to the wood as I have already described. The remainder of the afternoon would be spent in the wood, then, possibly round about 6 o'clock, we would proceed down the lane to the "Cricketers" at Addington, where one could usually refresh the inner man to advantage. A little further on, and on the opposite side of the road, was an old lichen-covered fence where the larvae of *Boarmia (Cleora) lichenaria*, Hufn., were quite common, and having spent half an hour or so there, it was time to push on to Shirley Heath for the rest of the evening, and usually a scramble for the last train home again. At other times one might work only the wood or only the heath according to the time at one's disposal and the particular species that one wished to get.

West Wickham Wood as I first knew it was, I think without

doubt, the most delightful collecting ground I ever entered. There were patches of young birch, clumps of pine, stately beech, plenty of oak and a generally mixed undergrowth. A public bridle path ran right through it and, to cap the lot, there was one of the most venomous old Keepers that I ever knew. It may be that I was particularly unfortunate, for I had seen him only once or twice when, while I was larva hunting one night, I very nearly trod on a sitting pheasant; of course she went up like a rocket, making about as much noise, and I slipped back onto the bridle path as quickly and as quietly as possible, where he very soon found me. Of course I was within my rights there, but he had heard it all and vowed vengeance. Thereafter we could never pacify the old man, but we found, quite by chance, that he had a weak spot, and by leaving a sufficient number of cold gins for him at the "pub" at Shirley, we were pretty safe for the evening. Quite a number of decent species were to be taken fairly regularly in the wood and occasionally something unexpected might fall to one's lot, such as *Dyschorista* (*Orthosia*) *suspecta*, Hüb., a species which, I believe, is not often met with in the South. I last saw West Wickham Wood on Easter Monday in 1907 and I derived little pleasure from my visit. A large part of the bridle path has been fenced in and the small portion of the wood still open, towards the Addington end, was over-run by a crowd of picnickers and the like. Its present condition is better known to many of you than it is to me, but I understand that a large part has been converted into a golf course and that houses have begun to be built along what was once the bridle path.

Shirley Heath, which by the way was also known as Addington Hills, was a very different proposition. It was an elevated, slightly undulating tract extending over many acres, completely covered with heather and over the greater part of it hardly a bush to break the monotony, but it was a wonderful place for the majority of the heath-loving species. *Ematurga atomaria*, L., *Eupithecia nanata*, Hüb., *Eupithecia goossensiata*, Mab. (*minutata*, Dbld.) and *Anarta myrtilli*, L., were all abundant; *Dyscia fagaria*, Thunb. (*Scodiona belgiaria*, Hüb.), *Pachygnemina hippocastanaria*, Hüb., and *Agrotis strigula*, Thunb. (*porphyrea*, Hüb.) were very common. Of *Agrotis agathina*, Dup., a hundred or more larvae were often swept from the heather of an evening, but it was very seldom that any imagines resulted from them; it was much better to collect a dozen or so by searching the heather by the light of a lantern, when with careful management one was pretty sure to breed a few moths. The last time I visited the heath it was a barren waste; the trampling of thousands of the little feet of Sunday School children, who had held their treats there, had trampled most of the heather out of existence; so bare was the place that I doubt if any self-respecting caterpillar could have maintained itself, and I fear it is still in much the same state.

Happily there still remain one or two of our old hunting grounds near London. Wimbledon Common, judging from the frequent exhibits that we see from that neighbourhood, for it is many years since I last visited it, is no doubt well worthy of attention. Paul's Cray Common near Chislehurst has altered little and may still be worth a visit; it was always a good spot for Tortrices and I have no doubt that one may still gather a supply of *Operophtera fagata*, Scharf. (*Cheimatobia boreata*, Hüb.) from the birch bushes on a November evening. Building has encroached largely in the Riddlesdown neighbourhood, but I believe we may still replenish our series of *Thera juniperata*, L., from the few juniper bushes that still remain, if we visit them on a mild October night.

Coombe Wood, that happy hunting ground of a former generation; Darenth Wood, well known in our own time and credited by our forefathers with the production of many rare species that never occurred within miles of it; and the more recently discovered Chattenden Roughs renowned for *Apatura iris*, L., *Nola albula*, Hüb., and many other local species not so many years ago, although still in existence have all altered greatly during recent years, either by the "advance of civilisation" or by neglect, and are not now the productive places that they used to be.

However deplorable the loss of so many of our old hunting grounds may be, we have some compensations. The opening up of new districts by the extension of the railway systems, the advent of the motor-bus and the motor-car, enable us to reach many out-of-the-way places that may, in all likelihood, yield rich harvests when they come to be fully explored, and which, in this present day, are far more easy of access than were many of those which we have lost, when we first knew them.

Some Observations on the Trypetidae.

By M. NIBLETT.—*Read 10th January, 1935.*

My attention was first directed to the family of flies known as the *Trypetidae* by the fact, that a number of species are gall-causers, and my chief interest being Cecidology, I wished to obtain some information of this section of gall-causing insects. I soon realized that there was very little literature published in English referring to these flies, and still less touching upon their biology. A considerable amount of work has been done by foreign dipterists in connection with this family, but as I had not access to their works, this fact was not of much use to me. Apparently the best thing to do under the circumstances was to try and rear the insects myself, and this I decided to do. As I have just mentioned, it was the gall-causing Trypetids in which I was interested, and my early attempts to rear these were carried out in a more or less haphazard fashion; I collected portions of plants which were galled, placed these in suitable receptacles and awaited results. In due course a number of gall-causing Trypetids emerged, and in addition several species which, as far as I knew had nothing whatever to do with gall formation. This fact led me deeper into the matter, and the outcome of it was, that I began to investigate the distribution of the larvae in their various food-plants. There appear to be big differences in time of duration of larval, pupal, and imaginal states in different species, and also in different broods of a single species; of the egg state I can say but little, not having had an opportunity to investigate it. With the species whose larvae live in flower-heads the eggs are deposited in, or on, the receptacle in the flower, the larvae when hatched remaining in the situation best suited to their mode of existence; in these species the female fly has usually a very long ovipositor, although there are exceptions, some species with larvae living in flowers of some size being provided with remarkably short ones.

In the leaf-mining and fruit-feeding species the ovipositor is usually short, as one would expect; of the species whose eggs are deposited in the roots of plants I can say nothing, as I have not yet had an opportunity to observe any of these flies.

The larvae of a large number of our British *Trypetidae* live in the

flower-heads of plants of the Composite order, some are leaf-miners, while others live in stems or roots; a few species in each location, excepting the leaf-miners, causing the formation of galls. The flower-head larvae feed upon the floral receptacle, florets, and the seeds, and certain species construct a cocoon of pappus-hairs, in which they eventually pupate. The larvae of some species actually live inside the seeds, and these are a rather difficult group. The first of these larvae to come to my notice were those of *Orellia* (*Trypeta*) *tussilaginis*, Fab., in the flower-heads of *Arctium majus*, L., the larvae were entirely enclosed in the seeds, there was no sign of any entrance hole, the seeds being to all appearance normal, except that perhaps they were a little stouter than the uninhabited seeds. When the fly was ready to emerge, it broke through the end of its puparium and then apparently emerged through an opening in the end of the seed.

There appears to be a considerable difference of opinion as to where the larvae of *Urophora quadrifasciata*, Mg., pass their lives. Many continental entomologists have published statements to the effect that the larvae cause the formation of a plurilocular gall. Tavares states that in the Iberian Peninsula the larvae live in the achenes, causing a gall similar to that caused by the Cynipid *Isocolus jaceae*, Schr., and also mentions that in other parts of Europe the species is the cause of a plurilocular gall. I do not of course know whether Tavares had seen these, but I think it probable that he quoted from the publications before mentioned. My own observation of this species do not agree with either of these statements. The white larvae of *U. quadrifasciata* live in the achenes and also pupate therein, but there is definitely no gall; the seed inhabited by a larva appears to expand as the larva grows, and when approaching maturity the anal extremity of the larva projects from the lower end of the seed. I find that unless one can examine fresh flower-heads containing the larvae or pupae, it is difficult to decide the exact position they occupy; if you open dry, or old heads, the larvae or pupae usually drop out, and as the thin skin of the achene has practically disappeared, one is apt to draw wrong conclusions. I have found the larvae of this species only in the flower-heads of *Centaurea nigra*, L., but it has been recorded on the Continent from those of *C. cyanus*, L., *C. scabiosa*, L., *C. jacea*, L., etc.

It will probably be found that quite a number of the Trypetids whose foodplants have not yet been discovered have larvae which pass their existence in the achenes. I have found several species of plants with larvae in the seeds, which up to the present I have failed to rear. I have not yet found out when the larvae enter the seeds; they certainly cannot do so until the seeds have made some definite growth. In the case of *O. tussilaginis* to which I have just referred, the seeds were hard and dry and the larva full grown when

I found them; they must live in a state of constant compression as the larvae are decidedly larger than the seeds containing them.

There are probably some 80 odd species of *Trypetidae* occurring in Britain. "Verrall's List" gives 60, several of which are doubtful, but I have based my assumption on the following grounds: There are among European *Trypetidae*, of which the foodplants appear to be unknown, 14 species which may probably occur in Britain (a number of these species have been taken); in addition, 5 species whose larvae are stem-feeders, 4 root-feeders, 5 leaf-miners, 6 fruit-feeders, and 48 of which the larvae live in flower-heads, all of which feed upon species of plants indigenous to this country, and I think that we may safely assume that the flies of a very large percentage of these are in all probability native species.

In addition to "Verrall's List" there have been published a number of local lists of *Trypetidae* in the Transactions of local societies, and in our entomological journals, but I feel sure they fall short in every case of the number of species to be found in the respective localities to which they refer, as is usually the case where the workers are few.

Undoubtedly many species of *Trypetidae* are very local or have periods of great scarcity. As an instance *Tephritis (Oxyna) flavipennis*, Lw., may be cited. Verrall only came across the fly twice during 40 years collecting, but in 1904 and again in 1911, Mr. G. C. Lamb found it abundant in a locality in Cornwall; it has also been taken since in the west of England; my friend Mr. H. J. Burkill found numerous empty galls caused by this species at Fetcham, Surrey, in 1933, and I found several myself at Epsom in 1934 upon the roots of its foodplant *Achillea millefolium*, L.

Gonioglossum wiedemanni, Mg., a species of which the larvae live in the berries of *Bryonia dioica*, L., I sought unsuccessfully over considerable areas for several years, but in 1933 a hedgerow near Banstead, Surrey, had a number of Bryony plants trailing over it, with, I should estimate, quite one third of the fruits containing the larvae of this species.

A species of which the foodplant is scarce or local one would naturally expect to find confined to those localities where the foodplant grows, but it appears that species which have numerous foodplants, or one of wide and plentiful distribution, are frequently scarce or absent in such localities.

It is quite an easy matter to gain a wrong impression of the distribution of a species by casual observation, and to obtain true facts one must make a constant and systematic search. I am of opinion that a more correct estimate of the distribution of *Trypetidae* can be obtained by searching for the larvae than by haphazard sweeping with a net in the hope of taking the flies.

My discovery of *Orellia (Trypeta) winthemi*, Mg., a species

previously unrecorded for Britain, was made by collecting larvae in the flower-heads of *Carduus crispus*, L.; these were taken on Ranmore Common, Surrey, and a casual examination told me that there were larvae in them which were unfamiliar to me. The following year, 1933, some more larvae were found in flower-heads of the same plant at Banstead; both these groups of thistles I had swept with a net on previous occasions, but had failed to capture a fly of this species. I do not wish to suggest that it is not advisable to try and capture the insects themselves, but I consider that both methods should be employed, and that particular notice be taken of the plant or plants from which insects are swept. If one is careful to sweep individual species of plants, the number of insects captured is, as a rule, much less than can be obtained by general sweeping, but I feel that the information so obtained is of far more scientific value.

In my searches for the larvae of Trypetids I have noticed that with some species, they are to be found chiefly upon isolated plants scattered over a wide area: this is especially the case with *Orellia* (*Trypeta*) *ruficanda*, Fab. (*florescentiae*, L.) in the flower-heads of *Cnicus palustis*, L. On the other hand *Sphenella marginata*, Fall., of which the larvae feed in the flower-heads of several species of *Senecio*, rather favours crowded groups of plants. These larvae I have found in Ragwort, occasionally in scattered plants, but freely where the plant grew thickly; in Groundsel I have never found a plant with larvae where the plants were scattered, but in two localities where I found a big patch of Groundsel plants crowded together, over 70% of the flowers had larvae in them. With reference to the first mentioned of these big patches, I visited the locality two years afterwards and found that practically all the Groundsel had disappeared, but that there were many plants of Ragwort growing there, of these I examined about 100 flower-heads, and failed to find a single larva of *S. marginata*.

Mr. J. W. Saunt speaks of *Urophora cardui*, L., being very scarce in Warwickshire; in Surrey, the galls caused by this species are to be found almost everywhere where its host-plant *Cnicus arvensis*, L., occurs, and upon several wet commons they are always to be found in considerable numbers. I have only met with the fly upon rare occasions, which seems to have been the experience of Mr. A. H. Hamm in the Oxford district.

Terellia (*Trypeta*) *serratulae*, L., is a species of which I found but very few larvae until 1934, when a comparatively few flower-heads of *Cnicus lanceolatus*, Scop., and *Carduus nutans*, L., yielded a considerable number of the flies.

Hamm speaks of taking *Ceriocera* (*Trypeta*) *ceratocera*, Hand. (*cornuta*, F.) in numbers; I have had thousands of flower-heads of *Centaurea scabiosa*, L., its host-plant, through my hands during the past few years, and the larvae have only occurred twice, yielding a

total of 8 flies. Another species he mentions as being very plentiful in his district is *Tephritis vespertina*, Lw.; although I have found the larvae in considerable numbers, and have had many of the flies emerge during July and August, I have failed to capture a single specimen by sweeping its food-plant, *Hypochoeris radicata*, L., during August and September in localities, where I had found the larvae abundant.

Urophora quadrifasciata, Mg., is double-brooded, pupae found in early July yielding the fly in mid-July; while from flower-heads taken later in the year with larvae in them, the flies emerged in June of the following year. I had bred comparatively few flies of this species from some thousands of flower-heads of its host-plant; but in the spring of 1934 I had dozens emerge from quite a small number of the heads. I found the flies very plentiful in one locality in the summer of 1933, but flower-heads collected here later, yielded less than a dozen flies from several hundreds of the heads.

An interesting point which may be noted here (and which is common to many species that are double-brooded), is the difference in time taken by the two broods to reach maturity. The brood over-wintering in the larval stage usually emerges during June, having taken about 10 months to reach the final state, while the following brood which emerges in July, can only take about a month at the most to pass from egg to imago.

It is difficult to understand the reason why the larvae of some species of a genus cause gall-formation, while others do not, or again why some will encase themselves in a cocoon of pappus-hairs, while others of the same genus live naked in the flower-heads.

The larvae seem to have the power to gnaw their way through quite tough material; it is not at all an uncommon thing to find the larvae of *Chaetostomella* (*Trypeta*) *onotrophes*, Lw., in the space below the floral receptacle. It has been recorded that the larva of at least one species, which is normally confined to the flower-head, had been found in the stem of its food-plant, and so was recorded as a stem-feeder. I am of opinion that its occurrence there was quite accidental; in all probability the larva had got below the receptacle, and finding a hollow, or partly hollow stem beneath it, worked its way down in search of a convenient place in which to pupate.

The larvae of *Orellia* (*Trypeta*) *colon*, Mg., commence their existence in the floral receptacle of *Centaurea scabiosa*, L., gradually eating it away until a cell is formed. When nearly full-fed they apparently gnaw a hole through to the upper surface, and either pupate there or return to the cell they have made in the substance of the receptacle; in either position they finally pupate in a cocoon formed of pappus-hairs. I find that this species is definitely double-brooded, having bred flies in early August from larvae taken

in July, and again in June from larvae obtained in August and September of the previous year.

When we consider that the larvae of the *Trypetidae* are legless maggots with no great powers of locomotion, the facts I have just stated in reference to the larvae of *O. colon* seem almost incredible. Leaf-mining and fruit-feeding larvae gnaw their way out so that they may reach the earth to pupate therein, but in these cases there is little material to remove. I believe that the stem- and root-feeding larvae which pupate in the plant, usually leave the task of providing an exit to the imago when it is ready to emerge. It has been recorded however that the larva of at least one species prepares the exit hole for the adult insect.

It will be found sometimes that two species living under almost identical conditions have very different life-histories; as an instance we may take *Tephritis hyoscyami*, L., and *Orellia winthemi*, Mg., the larvae of both these species live in the flower-heads of the thistle, *Carduus crispus*, L., the larvae of the former species mature and pupate during July and August, the flies emerging in the latter month; while the larvae of the latter overwinter as larvae, pupating some time in the late spring, the flies emerging during June.

The larvae of some species of Trypetids are confined to one host plant, some affect perhaps two or three closely allied species, while a few have quite a number of host-plants: *C. onotrophes* had 7 to which I have added one more, i.e., *Serratula tinctoria*, L.; *Trypeta* (*Spilographa*) *zoë*, Mg., has 6; *Ensina sonchi*, L., 10, in 6 of which I have found the larvae, while *Trypanea* (*Urellia*) *stellata*, Fuess., has 11.

The puparia vary considerably in form and colour, some being smooth, with evenly rounded ends, others are more or less egg-shaped and still smooth, while with some the segments are separated by quite deep grooves giving a corrugated appearance. Colour is also very variable, ranging from straw to yellow, from red-brown to chocolate, while in a number of species the puparium is black. Frequently the colour also changes soon after pupation, usually within 24 hours.

With the species pupating in galls, flower-heads, etc., the process of changing from an active larva to a puparium is spread over a considerable period of time, but with the species which leave their foodplant the time is very short, the active larva being transformed into a puparium often within a few hours following its exit.

The larvae of Trypetids are at times heavily parasitized by Chalcids and Braconids, the latter insects confining themselves, as far as my own observations show to a few species, while the former are universal parasites of the family. There are at least three species of Chalcids which attack the larvae of *U. solstitialis*, and in connection with one species there is a most interesting phenomenon: *Eurytoma curta*, Wlk., which is an endoparasite, causes premature

pupation of the *solstitialis* larva, it pupating in the autumn instead of the following spring; my attention was drawn to this fact by Mr. G. C. Varley, whose observations I am happy in being able to confirm.

I have bred several species of Ichneumons also from the material containing the Trypetid larvae, but have not yet been able to decide definitely whether they emerged from Trypetid, or from unobserved Lepidopterous larvae; in certain cases it is more than probable that the Trypetid larva was the host.

The percentage of parasites I have bred at times from these larvae has been very high and with certain species must be a very definite check, larvae of *T. zoë*, which have occurred in my garden in mines upon the leaves of *Chrysanthemum maximum* for some years past, have been so heavily attacked by Chalcids that I have had very few flies emerge from many dozens of the larvae, and in 1934 I was unable to find a single mined leaf.

The larvae of the *Trypetidae* occurring in warmer climates than ours are frequently pests of considerable economic importance, doing very great damage to the fruits of orange, olive and cherry in Europe, and to numerous fruits in the Tropics. The only species which is of any economic importance in Britain is *Acidia heraclei*, L., the "Celery Fly," which mines the leaves of celery and parsnip.

Our few species of "fruit flies" attack only fruits of Wild-Rose, Hawthorn, White Bryony and possibly Cherry. I do not think that the "Asparagus Fly" *Platyparea poeciloptera*, Schr., occurs here, but it does considerable damage to Asparagus on the Continent, the larva boring in the stems. The remaining species of British Trypetids are of no economic importance, but there is a possibility that their parasites may be.

In North America two species of *Rhagoletis* attack cherries and one species apples, while the larva of a recently discovered species feeds in the hull of walnuts. It was estimated that in 1915 *Dacus oleae*, Gml., caused damage in Italy to the olives, to the extent of £8,000,000. *Dacus curcubitae*, Coqu., attacks fruits of the melon family and also tomatoes, and in Hawaii alone has done damage to the extent of £1,000,000 yearly.

An interesting discovery was made some years ago when it was found that the males of certain species of *Trypetidae* were attracted by the odours of certain oils, including citronella and kerosene. I do not think that any experiments have been made in this direction with our British species but it would certainly be interesting to find out if any are so attracted.

In the Palaearctic Region there are 400 species of *Trypetidae* known. Of these about 130 species are, as far as is at present known, confined to Europe, while of the remainder some are only found in Eastern Asia, and some are spread over the whole of the Region. Some of our British species have a very wide range.

Trypeta artemisiae, Fab., occurs in Europe and also in Japan; *Terellia serratulae*, L., in Europe, Persia and North Africa; *Orellia colon* in Europe, N. Africa and Asia Minor; *Orellia ruficauda* in Europe and Central Asia; *Tephritis bardanae*, Schr., has been recorded from Turkestan; *Trypanea amoena*, Frfld., from Europe, N. Africa, Canary Islands and Asia. Certain species appear to be confined to restricted areas, but this may be because other areas have not been worked sufficiently, although the question of the foodplant of the larva has undoubtedly considerable bearing upon this.

I trust that these observations of mine upon the *Trypetidae* have shown that a little careful observation will bring many interesting facts to light; and that they have given some idea of the possibilities of research still to be done in connection with the biology of this interesting family of flies.

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1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909,
1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917,
1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925,
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1935-1936.

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hem, Hemiptera; *hy*, Hymenoptera; *l*, Lepidoptera; *mi*, Microscopy; *mo*,
Mollusca; *n*, Neuroptera; *nat. phot*, Nature Photography; *oo*, Oology; *orn*,
Ornithology; *orth*, Orthoptera; *p.(od)*, Paraneuroptera (Odonata); *r*, Reptiles;
t, Trichoptera.

—*—

YEAR OF
ELECTION.

- 1886 ADKIN, B. W., F.R.E.S., "Highfield," Pembury, Tunbridge
Wells. *l, orn*.
- 1922 ADKIN, J. H., *Hon. Lanternist*, Lamorran, Oak Lane,
Sevenoaks. *l*.
- 1901 ADKIN, R. A., 1, Hartfield Court, Eastbourne. *mo*.
- 1928 ANDERSON, C. D., 22, Mount Park Road, Ealing, W.5.
- 1907 ANDREWS, H. W., F.R.E.S., 6, Footscray Road, Eltham,
S.E. 9. *d*.
- 1901 ARMSTRONG, Capt. R. R., B.A., B.C. (Cantab), F.R.C.S., F.R.C.P.,
F.R.E.S., 65, Lee Road, Blackheath, S.E.3. *e, l*.
- 1895 ASHBY, S. R., F.R.E.S., *Hon. Curator*, 37, Hide Road, Head-
stone, Harrow. *c, l*.
- 1934 ATKINSON, J. L., Down's Cottage, Northwood Road, Tankerton,
Kent. *l*.
- 1931 ATTWOOD, R. W., 36, Tannsfild Road, Sydenham, S.E.26.
- 1931 BALLARD, F., 40, Albert Road, Kingston-on-Thames.
- 1896 BARNETT, T. L., 31, Littleheath Road, Selsdon, Surrey. *l*.
- 1887 BARREN, H. E., 78, Lyndhurst Road, Peckham, S.E. 15. *l*.
- 1933 BAYNES, Capt. E. S. A., F.R.E.S., Monkshatch Cottage,
Compton, nr. Guildford. *l*.
- 1927 BEDWELL, E. C., F.R.E.S., 54, Brighton Road, Coulsdon,
Surrey. *c*.
- 1929 BELL, J. H., F.R.E.S., Dudswell Rise, Northchurch, Berkham-
sted, Herts.
- 1924 BIRD, Miss F. E., "Red Cottage," Cromwell Avenue, Billericay,
Essex. *orn*.
- 1911 BLAIR, K. G., D.SC., F.R.E.S., *Council*, "Claremont," 120,
Sunningfields Road, Hendon, N.W. 4. *n, c*.

YEAR OF
ELECTION.

- 1926 BLISS, A., 4, Monahan Avenue, Purley. *l*.
- 1925 BLYTH, S. F. P., "Cleeveland," Chislehurst, Kent. *l*.
- 1934 BORRER, C. D., 1, Fleet Street, E.C.4.
- 1923 BOUCK, Baron J. A., F.R.E.S., "Springfield," S. Godstone, Surrey. *l*.
- 1935 BOWLES, T. J., 29, Montague Avenue, Sanderstead, Surrey.
- 1933 BRETT, G. A., "Kishmed," Wolsey Road, Esher, Surrey. *ent*.
- 1936 BRIEGEL, R. H., 141, Burnt Oak Lane, Sidcup, Kent.
- 1909 BRIGHT, P. M., F.R.E.S., "Nether Court," 60, Christchurch Road, Bournemouth. *l*.
- 1936 BRITTON, EVERARD, 99, Cornwall Rd., Westbourne Pk., W 11.
- 1923 BROCKLEHURST, W. S., "Grove House," Bedford. *l*.
- 1927 BROCKLESBY, S. H., "Long Lodge," Merton Park, S.W.19. *l*.
- 1934 BRODIE P., B.A., 59, Buckingham Street, Aylesbury, Bucks. *mic, l*.
- 1930 BROOKE, Miss W. M. A., c/o Dr. Brooke, 99, The Avenue, Muswell Hill, N.10. *ec. ent., b., marine life*.
- 1909 BUCKSTONE, A. A. W., 90, Pams Way, Kingston Road, Ewell. *l*.
- 1927 BULL, G. V., B.A., M.B., *Council*, "White Gables," Sandhurst, Kent. *l*.
- 1915 BUNNETT, E. J., M.A., 72, Colfe Road, Forest Hill, S.E. 23. *c, mi*.
- 1922 BUSHBY, L. C., F.R.E.S., 11, Park Grove, Bromley, Kent. *c, het*.
- 1922 CANDLER, H., "Broad Eaves," Ashted, Surrey. *l, orn, b*.
- 1899 CARR, Rev. F. M. B., M.A., L.TH., Ditton Vicarage, Widnes, Lancs. *l, n*.
- 1924 CHAPMAN, Miss L. M., "Arolla," Waterlow Road, Reigate.
- 1922 CHEESEMAM, C. J., 100, Dallinger Road, S.E. 12. *l*.
- 1879 CLODE, W. (*Life Member*.)
- 1915 COCKAYNE, E. A., A.M., D.M., F.R.C.P., F.R.E.S., 116, Westbourne Terrace, W. 2. *l*.
- 1934 COLE, E.A.,
- 1935 COLLINS, R. J., 69, Beechen Lane, Kingswood, Surrey.
- 1899 COLTHRUP, C. W., 68, Dovercourt Road, E. Dulwich, S.E. 22. *l, ool, orn*.
- 1907 COOTE, F. D., F.R.E.S., *Council*, 32, Wickham Avenue, Cheam, Surrey. *l, b*.
- 1923 CORK, C. H., 11, Redesdale Street, Chelsea, S.W. 3. *l*.
- 1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common, S.E. 18. *l, c*.
- 1922 COUCHMAN, L. E., c/o Mrs. A. Couchman, May Cottage, Brooklane, Bromley, Kent. *l*.

YEAR OF
ELECTION.

- 1909 COULSON, F. J., *Vice-President*, "Burnigill," 24, Springfield Avenue, Merton Park, S.W.20. *c, hem.*
- 1928 COURT, T. N., "Oakleigh," Market Rasen, Lincoln.
- 1911 COXHEAD, G. W., 45, Leicester Road, Wanstead, E. 11.
(*Life Member.*) *c.*
- 1935 CRASKE, E. S., "Hillsborough," Gringer Hill, Maidenhead, Berks.
- 1934 CRASKE, J. C. B., 57, Cromwell Gardens, S.W.7.
- 1918 CRAUFURD, Clifford, "Denny," Bishops Stortford. *l.*
- 1933 CREWDSON, R. C. R., F.R.E.S., The Grange, Delamere, Northwich, Cheshire. *l.*
- 1920 CROCKER, Capt. W., Constitutional Club, Bexley Heath. *l.*
- 1898 CROW, E. J., 70, Hepworth Road, Streatham High Road, S.W. 16. *l.*
- 1932 CROW, P. N., Orchard Cottage, Cookham Dean, Berkshire. *l.*
- 1928 CURWEN, Capt. B. S., 9, Lebanon Pk. Twickenham. *l.*
- 1927 DANBY, G. C., "Sheringham," 31, Albion Road., Sutton, Surrey. *l.*
- 1925 DANNATT, Walter, F.R.E.S., F.Z.S., 94, Gaibal Road, Lee, S.E.12. *l, el.*
- 1900 DAY, F. H., F.R.E.S., 26, Currock Road, Carlisle. *l, c.*
- 1933 DEMUTH, R. P., 7, Holland Park Avenue, W.11. *l.*
- 1889 DENNIS, A. W., 56, Romney Buildings, Millbank, S.W.1.
l, mi, b.
- 1930 DENVIL, H. G., *Hon. Minuting Secretary*, 4, Warwick Road, Coulsdon, Surrey. *l, c.*
- 1901 DODS, A. W., 35, The Mall, Southgate, N.14. *l.*
- 1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading. *l.*
- 1936 DOUDNEY, S. P., 110, Foxley Lane, Purley, Surrey. *l.*
- 1930 DOWNES, J. A., B.SC., 120, Pepys Road, Wimbledon, S.W.20.
ent, l.
- 1930 DUDBRIDGE, B. J., B.A., Colonial Administrative Service, Tanganyika; and 13, Church Lane, Merton Park, London, S.W.17; and c/o The Secretariat, Dar-es-Salaam. *ent.*
- 1927 EAGLES, T. R., *Hon. Treasurer*, 32, Abbey Road, Enfield, Middlesex. *l, c.*
- 1886 EDWARDS, S., F.L.S., F.Z.S., F.R.E.S., (*Hon. Member*), 20, Spring Grove, Harrogate. *l, el.*
- 1933 ELGOOD, W. S., North Bank, Wisbech, Cambs.
- 1923 ELLIS, H. Willoughby, F.R.E.S., F.Z.S., M.B.O.U., Friary Hill, Weybridge, Surrey *c, orn.*
- 1932 ENNIS, L. H., 16, Ernle Road, Wimbledon, S.W.20. *l.*

YEAR OF
ELECTION.

- 1935 ENSOR, G. A., 7, Mount Nod Road, Streatham, S.W.16.
- 1920 FARMER, J. B., 156, Loughborough Park, Brixton, S.W.9. *l.*
- 1924 FASSNIDGE, Wm., M.A., F.R.E.S., 47, Tennyson Road, Portswood, Southampton. *l, n, hem.*
- 1930 FERRIER, W. J., 86, Portnalls Road, Coulsdon, Surrey. *l.*
- 1887 FLETCHER, W. H. B., M.A., F.R.E.S., Aldwick Manor, Bognor, Sussex. (*Life Member.*) *l.*
- 1926 FLETCHER, P. Bainbrigge, M.B.C., A.I.C., F.R.E.S., 65, Compton Road, Wimbledon, S.W.19. *c, l.*
- 1889 FORD, A., "South View," 42, Irving Road, West Southbourne, Bournemouth, Hants. *l, c.*
- 1920 FORD, L. T., "St. Michael's," Park Hill, Bexley, Kent. *l.*
- 1915 FOSTER, T. B., "Lenore," 1, Morland Avenue, Addiscombe, Croydon. *l.*
- 1907 FOUNTAINE, Miss M. E., F.R.E.S., "The Studio," 100A, Fellows Road, Hampstead, N.W.3. *l.*
- 1921 FRAMPTON, Rev. R. E. E., M.A., Innrams Corner, Crowborough, Sussex. *l.*
- 1933 FRASER, Angus, Ranelagh, Gloucester Road, Tankerton, Kent. *c.*
- 1886 FREMLIN, Major H. S., M.R.C.S., L.R.C.P., F.R.E.S., "Heavers," Ryarsh, Kent. *l.*
- 1919 FRISBY, G. E., F.R.E.S., 29, Darnley Road, Gravesend. *h.*
- 1912 FROHAWK, F. W., F.R.E.S., M.B.O.U., "Essendene," Cavendish Road, Sutton, Surrey. *l, orn.*
- 1928 GILLES, W. S., F.R.E.S., F.I.C., "The Cottage," Bocking, Braintree, Essex. *l.*
- 1930 GILLIATT, F. T., F.R.E.S., 25, Manor Road, Folkestone, Kent. *l.*
- 1929 GLEGG, D. L., F.R.E.S., "Birchstone," Coombe Park, Kingston, Surrey. *l.*
- 1936 GOODE, FRANK, 275, Eastern Avenue, Ilford, Essex. *l.*
- 1935 GOODLIFFE, F. D., Agricultural College, Long Sutton, Basingstoke. *ec. ent.*
- 1920 GOODMAN, A. de B., F.R.E.S., The Old Malt House, Shenley, Church End, nr. Bletchley, Bucks. *l.*
- 1926 GORDON, D. J., B.A., F.R.E.S., Craigellachie House, Strathpeffer, Ross. *c., l.*
- 1924 GRANT, F. T., 37, Old Road West, Gravesend. *l.*
- 1918 GREEN, E. E., F.R.E.S., F.Z.S., "Ways End," Camberley, Surrey. *hem.*
- 1924 GREER, T., J.P., "Milton," Sandholes, Dungannon, Co. Tyrone. *l.*

YEAR OF
ELECTION.

- 1926 GREY, Olive, Mrs., F.Z.S., 90, Charing Cross Road, W.C.2. *ent.*
- 1932 GRIFFIN, F. J., A.L.A., 41, Queen's Gate, S. Kensington, S.W.7.
ent.
- 1933 GROCOCK, L. O., "Brasted," 53, Sherwood Road, Addiscombe,
Croydon.
- 1911 GROSVENOR, T. H. L., Springvale, Linkfield Lane, Redhill. *l.*
- 1934 GUNTON, Major H. C., M.B., F.R.E.S., "Rathgar," Gerrards
Cross, Bucks. *l.*
- 1884 HALL, T. W., F.R.E.S., Woodgrange, Shire Lane, Chorley
Wood, Herts. *l.*
- 1891 HAMM, A. H., A.L.S., F.R.E.S., 22, Southfields Road, Oxford. *l.*
- 1903 HARE, E. J., F.R.E.S., 4, New Square, Lincoln's Inn, W.C. 2. *l.*
- 1926 HARMSWORTH, SIR H. A. B., F.R.E.S., 4, Kensington Palace
Gardens, W.8.
- 1933 HARRIS, CHAS. W., 7, Roseberry Gardens, Dartford. *l.*
- 1924 HARWOOD, P., F.R.E.S., Westminster Bank, 292, Wimborne Road,
Winton, Bournemouth. *l.*
- 1927 HAWGOOD, D. A., 2, Kingsmead Road, Tulse Hill, S.W.2. *l.*
- 1924 HAWKINS, C. N., F.R.E.S., 23, Wilton Crescent, Wimbledon,
S.W.19. *l.*
- 1929 HAWLEY, Lt.-Col. W. G. B., Sibton Church Farm, Yoxford,
Suffolk.
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Estacion
Experimental, Concordia, F.C.E.R., Argentina. *l. orn, c.*
- 1920 HEMMING, Capt. A. F., F.Z.S., F.R.E.S., 18, Glebe Place, Chelsea,
S.W.3. *l.*
- 1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *c.*
- 1931 HERRMANN, E. R., 29, Lebanon Park, Twickenham. *l.*
- 1931 HESLOP, I. R. P., M.A., F.R.E.S., 34, Henleaze Gardens, Westbury
on Trym, Bristol and Nigerian Administrative Service,
Obetim, Warri Province, viâ Sapele, Southern Nigeria,
West Africa. *l.*
- 1927 HEWER, H. R., M.Sc., D.I.C., Royal College of Science, S. Ken-
sington, S.W. 7.
- 1920 HODGSON, S. B., "St. Philips," Charles Street, Berkhamsted,
Herts.
- 1927 HOWARD, J. O. T., M.A., 5, East Sheen Lodge, Sheen Lane,
S.W.14.
- 1931 HOWARTH, T. G., 77, Woodland Rise, Muswell Hill, N.10. *l.*
- 1934 HUGGINS, H. C., 875, London Road, Westcliff-on-Sea. *l, ent.*
- 1929 HUGHES, A. W., "Delamere," Buckingham Way, Walling-
ton. *l.*
- 1933 HUTCHINGS, H. R., 127, Chadacre Road, Stoneleigh, Surrey. *l.*

YEAR OF
ELECTION.

- 1928 JACKSON, F. W. J., "The Pines," Ashtead, Surrey.
- 1914 JACKSON, W. H., "Pengama," 14, Woodcote Valley Road, Purley. *l.*
- 1923 JACOBS, S. N. A., *Hon. Secretary*, Ditchling, 54, Hayes Lane, Bromley. *l, el.*
- 1924 JAMES, A. R., 14, Golden Lane, E.C.1. *l.*
- 1924 JAMES, R., F.R.E.S., 14, Golden Lane, E.C.1.
- 1927 JANSON, O. J., F.R.E.S., *Recorder*, 13, Fairfax Road, Hornsey, N.8. *ent.*
- 1936 JARRETT, J., 1, Highbury Close, New Malden; Surrey.
- 1925 JARVIS, C. McK., 68, Clyfford Rd., West End Road, Ruislip, Middlesex. *c.*
- 1923 JOHNSTONE, J. F., F.R.E.S., "Courtlands," Clarence Parade, Southsea. *l.*
- 1933 JONES, H. G. C., 33, Berrylands, Surbiton, Surrey. *l.*
- 1932 JOY, NORMAN H., M.R.C.S., L.R.C.P., F.R.E.S., M.B.O.U., 1a, Pound Farm Lane, Chichester, Sussex. *c, orn.*
- 1936 KENNARD, D. E. G., B.Sc., 3, Vanburgh Pk. Rd. West, S.E.3. *ent.*
- 1928 KETTLEWELL, H. B. D., Miller Hospital, Greenwich, S.E.10. and 15, St. Augustine's Road, Edgbaston, Birmingham. *l.*
- 1933 KEYWOOD, K. P., Croft Cottage, Hare Lane, Claygate, Surrey. *ent, orn.*
- 1910 KIDNER, A. R., "Southwood," The Drive, Sidcup, Kent. *l.*
- 1925 KIMMINS, D. E., 16, Montrave Road, Penge, S.E. 20. *l.*
- 1933 KING, H., D.Sc., F.R.S., *Council*, "Amanita," 28, Hawthorne Avenue, Northwick Park, Harrow. *l, orn.*
- 1935 KIRBY, Miss Kathleen, S. L. F., 70, Dukes Avenue, Chiswick, W.4.
- 1925 LABOUCHERE, Lt.-Col. F. A., F.R.E.S., 15, Draycott Avenue, S.W.3.
- 1927 LAWSON, H. B., F.R.E.S., Churchmead, Pirbright, Surrey. *l.*
- 1936 LEADER, B. J., "Rosemerrin," Bude, Cornwall. *l.* (Imp. Coll. Science).
- 1922 LEECHMAN, C. B., "Pansala," Roundabouts, Storrington, Sussex. *l.*
- 1914 LEEDS, H. A., Wood Walton, near Sawtrey, Huntingdon. *l.*
- 1934 LINE, H. V., "Brookside," St. Peters Road, Orpington.
- 1933 LIPSCOMB, C. G., Lieut., Somerset Light Infantry, Blackdown, Surrey. *l.*
- 1932 LOW, A. M., 6, Manor Gardens, Gunnersbury Pk., Acton.
- 1936 LOWE, CAPT. J. H. B., R.E. 69, Oakwood Court, W. 14. *l.*

YEAR OF
ELECTION.

- 1931 MACNULTY, B. J., *Council*, "Rutland," 67, All Saints Road, Sutton, Surrey. *l*.
- 1892 MAIN, H., B.SC., F.R.E.S., F.Z.S., 9, Woodside Road, Woodford Wells, Essex. *l, nat. phot., c*.
- 1889 MANSBRIDGE, W., F.R.E.S., "Monreith," Derby Road, Formby, Liverpool. *l, c., etc*.
- 1932 MARCON, Rev. J. N., 69, St. Thomas Road, West Tarring, Worthing.
- 1930 MARSH, D. G., *l*
- 1922 MASSEE, A. M., D.SC., F.R.E.S., East Malling Research Station, Kent. *l*.
- 1934 MEARS, T., 97, Pepys Road, Wimbledon, S.W.20.
- 1932 MELLOWS, W. T., M.B.E., LL.B., Scatton, Thorpe Road, Peterborough.
- 1936 MILBORROW, G., 83, Hargwyne St., Stockwell, S.W.9. *l*.
- 1889 MOORE, H., F.R.E.S., 9, Hoopwick Street, Deptford, S.E.8. *l, hem, d, e l, e hym, e d, mi*.
- 1930 MORLEY, A. McD., 9, Radnor Park West, Folkestone.
- 1920 MORISON, G. D., B.SC., PH.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marichall, Aberdeen. *ec. ent*.
- 1935 MULLER, Miss I. M., "Appledore," Mugswell, Chipstead, Surrey.
- 1934 MUSGRAVE, A. J., 21, Loveday Road, W.13.
- 1923 NASH, T. A. M., D.SC., PH.D., F.R.E.S., Tsetse Investigation, Gadau, via Joss, N. Nigeria. *l*.
- 1906 NEWMAN, L. W., F.R.E.S., Salisbury Road, Bexley, Kent. *l*.
- 1926 NEWMAN, L. H., Salisbury Road, Bexley, Kent. *l*.
- 1930 NIBLETT, M., *President*, 10, Greenway, Wallington, Surrey. *galls*.
- 1926 NIXON, G. E., B.A., 3², Kenway Road, Earl's Court, S.W. *hy, l*.
- 1936 NORTON, Wallis, S. G., Norton House, Peaks Hill, Purley, Surrey. *ent*.
- 1932 O'FARRELL, A. F., 20, Crescent Road, Wimbledon, S.W.19. *l*.
- 1934 OLIVER, G. B., "Hazlemere," High Wycombe, Bucks. *l*.
- 1935 OWEN, A. H., 41, Coombe Road, Croydon, Surrey. *l*.
- 1911 PAGE, H. E., F.R.E.S., 9, Vanbrugh Hill, Blackheath, S.E.3. *l*.
- 1927 PALMER, D. S., "North Lodge," Esher.
- 1930 PEARMAN, Capt. A., Elm Cottage, Purley, Surrey. *l*.
- 1908 PENNINGTON, F., Oxford Mansions, Oxford Circus, W.1. *l*.
- 1928 PERKINS, J. F., F.R.E.S., 19, Courtfield Gardens, S.W.5. *l*.
- 1933 PEYTON, A. G., Holly Bank, Napleton Road, Ramsgate. *l*.
- 1933 PINHEY, E. C. S., 36, Wetherby Mansions, Earl's Court Square, S.W.5. *ent*.

YEAR OF
ELECTION.

- 1933 PINNIGER, E. B., 19, Endlebury Road, Chingford, E.4. *p, l.*
- 1933 POOLES, S. W. P., "Richmond," Alderman's Drive, Peterborough. *l.*
- 1912 POULTON, PROF. Sir E. B., D.SC., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.R.E.S., "Wykeham House," Oxford. (*Hon. Member.*)
- 1927 PRATT, W. B., 10, Lion Gate Gardens, Richmond Lane, Richmond, Surrey.
- 1897 PREST, E. E. B., "Inwood," Madeira Drive, West Byfleet, Surrey. *l.*
- 1924 PRIEST, C. G., 67, Portland Road, Holland Park, W.11. *l.*
- 1904 PRISKE, R. A. R., F.R.E.S., 136, Coldershaw Road, W. Ealing, W. 5. *l, mo.*
- 1922 RAIT-SMITH, W., F.Z.S., F.R.E.S., F.R.H.S., "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*
- 1925 RALFS, Miss E. M., F.R.E.S., 27, Shaftesbury Road, Ravenscourt Park, W.6.
- 1887 RICE, D. J., 8, Grove Mansions, North Side, Clapham Common, S.W. 4. *orn.*
- 1920 RICHARDSON, A. W., F.R.E.S., 28, Avenue Road, Southall, Middlesex. *l.*
- 1936 RICHARDSON, N. A., 63, Finchley Lane, Hendon, N.W. 4. *l.*
- 1934 RIDEOUT, J. K., "Hodgsonites," Charterhouse, Godalming, Surrey.
- 1908 RILEY, Capt. N. D., F.R.E.S., F.Z.S., 7, McKay Road, Wimbledon, S.W.20. *l.*
- 1910 ROBERTSON, G. S., M.D., "Struan," Storrington, near Pulborough, Sussex. *l.*
- 1911 ROBINSON, Lady MAUD, F.R.E.S., Kirklington Hall, Newark. *l, n.*
- 1920 ROTHSCHILD, THE RIGHT HON. LORD, D.SC., F.R.S., F.L.S., F.Z.S., F.R.E.S., Tring, Herts. *l, orn. (Life Member.)*
- 1890 ROWNTREE, J. H., "Scalby Nabs," Scarborough, Yorks. *l.*
- 1936 ROYFFE, D. W., 2, Imperial Mansions, Bromells Rd., Clapham, S.W.4. *l.*
- 1932 RUDLAND, W. L., 211, Caversham Road, Reading.
- 1932 RUSSELL, A. G. B., M.V.O., F.R.E.S., Scarbank House, Swanage, Dorset. *l.*
- 1936 RUSSELL, J. A. P., Scarbank House, Swanage, Dorset. *ent.*
- 1915 RUSSELL, S. G. Castle, Homestead, Crawley, Winchester, Hants. *l.*
- 1936 SARD, G. J., 71, Sistova Road, S.W. 12. *l.*
- 1936 SCOPES, GOWING E., "Oakhurst," Oakwood Road, Crofton, Orpington, Kent. *l.*

YEAR OF
ELECTION.

- 1908 ST. AUBYN, Capt. J. G., F.R.E.S., F.R.P.S., 14, Purley Knoll, Purley.
- 1927 SCOTT, E., M.B., "Hayesbank," Ashford, Kent. *l.*
- 1923 SEVASTOPULO, D. G., F.R.E.S., (*Life Member*), c/o Ralli Bros. Ltd., Calcutta. *l.*
- 1933 SHARMAN, F. W., 183, Star Road, Peterborough. *l.*
- 1910 SHELDON, W. G., F.Z.S., F.R.E.S., "West Watch," Oxted, Surrey. *l.*
- 1898 SICH, ALF., F.R.E.S., Coburg Court Hotel, Bayswater Road, W.2. *l.*
- 1925 SIMMONS, A., 42, Loughboro Road, W. Bridgford, Nottingham. *l.*
- 1921 SMART, Major, H. D., R.A.M.C., M.D., D.S.C., F.R.E.S., 172, High Road, Salway Hill, Woodford Green. *l.*
- 1908 SPERRING, C. W., 8, Eastcombe Avenue, Charlton, S.E. 7. *l.*
- 1927 STANLEY-SMITH, F. S., F.R.E.S., *Council*, "Oaklands," Brompton, Huntingdon. *l.*
- 1928 STANLEY-SMITH, Mrs. Maud, *Council*, "Oaklands," Brompton, Huntingdon. *l.*
- 1934 STEPHENS, J. A., 44, Mount Road, Chatham.
- 1928 STOCKEN, H. E. W., Orchard Cottage, W. Byfleet, Surrey.
- 1924 STOREY, W. H., 39B, High Drive, New Malden, Surrey. *ent.*
- 1931 STOVIN, G. H. T., M.R.C.S., L.R.C.P., 42, Chalkwell Avenue, Westcliff-on-Sea, Essex.
- 1936 STREETER, ERNEST, Petworth, Sussex. *l.*
- 1929 STUBBS, G. C., 31, Egremont Street, Ely, Cambs.
- 1934 SUTTON, G. R., Kenilworth Gardens, Loughton, Essex.
- 1916 SYMS, E. E., F.R.E.S., *Vice-President*, *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *n, orth., p.(od.), t.*
- 1922 TAMS, W. H. T., F.R.E.S., 5, Daisy Lane, Hurlingham, S.W. 6. *l.*
- 1894 TARBAT, Rev. J. E., M.A., 1, Romsey Road, Winchester. *l, ool.*
- 1913 TATCHELL, L., F.R.E.S., Swanage, Dorset. *l.*
- 1934 TAYLOR, J. O., Lyndhurst, Grosvenor Road, Orpington. *l.*
- 1925 TAYLOR, J. S., M.A., F.R.E.S., Prickly Pear Laboratory, Graaffe Reinett, C.P., Union of S.A. *l.*
- 1929 TETLEY, J., "White Cottage," Silverlea Gardens, Horley.
- 1931 THOMPSON, J. A., Tan-y-Bryn School, St. Margarets Drive, Llandudno, N. Wales. *l.*
- 1933 THORPE, R. A., "Homestead," Forest Hill Road, Honor Oak, S.E.23.

YEAR OF
ELECTION.

- 1926 TOMLINSON, Miss Florence B., "The Anchorage," 51, Lodge Road, West Croydon. *l*.
- 1935 TOMPKINS, L. H., "Clifton," 18, Forest Side, Worcester Park, Surrey.
- 1902 TONGE, A. E., F.R.E.S., *Council*, "Aincroft," Grammar School Hill, Reigate. *l*.
- 1934 TUNSTALL, H. G., 11, St. James Avenue, Ewell, Surrey.
- 1887 TURNER, H. J., F.R.E.S., F.R.H.S., *Hon. Editor*, "Latemar," 25, West Drive, Cheam, Surrey. *l, b, e.l*.
- 1889 WAINWRIGHT, C. J., F.R.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d*.
- 1929 WAINWRIGHT, J. Chas., 9, Priory Road. Hook Road, Surbiton, Surrey.
- 1911 WAKELY, L. D., 15 Berkeley Place, Wimbledon, S.W.19. *l*.
- 1930 WAKELY, S., *Council*, 4, Auckland Road, Upper Norwood, S.E.19. *l*.
- 1880 WALKER, Comm. J. J., M.A., F.L.S., F.R.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c*.
- 1927 WALKER, W. H., "Ranworth," Potters Bar. *l*.
- 1920 WATSON, D., "Proctors," Southfleet, Kent. *l*.
- 1928 WATTS, W. J., 42, Bramerton Road, Beckenham. *c*.
- 1928 WELLS, Clifford, "Dial House," Crowthorne, Berks. *l*.
- 1911 WELLS, H. O., York Gate, Cheam Road, Ewell. *l*.
- 1911 WHEELER, The Rev. G., M.A., F.Z.S., F.R.E.S., "Ellesmere," Gratwicke Road, Worthing. *l*.
- 1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.
- 1934 WHITEHOUSE, Prof. H. Beckwith, M.B., M.S.LOND., 62, Hagley Road, Birmingham.
- 1925 WILLIAMS, H. B., LL.D., F.R.E.S., "Redmayes," 79, Broad Lane, Hampton-on-Thames, Middlesex. *l*.
- 1932 WILLIAMS, S. W. C., 17, Beresford Road, Chingford, E.4. *l*.
- 1932 WINDHAM, W. S., 40, Wellesley Road., Chiswick, W.4.
- 1927 WITTING, A. N., 6, Woolstone Road, Catford, S.E. 6.
- 1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l*.
- 1921 WOOD, H. WORSLEY, F.R.E.S., 37, De Freville Avenue, Cambridge. *l*.
- 1926 WOOTTON, W. J., F.R.H.S., Wannock Gardens, Polegate, Sussex. *l*.
- 1927 DE WORMS, C. G. M., *Council*, M.A., PH.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C., Milton Pk., Egham, Surrey. *l, orn*.

Members will greatly oblige by informing the Hon. Sec. of any errors in, additions to, or alterations required in the above Addresses and descriptions.

REPORT OF THE COUNCIL FOR 1935.



The passing of our very good friend Mr. Robert Adkin has cast a shadow over the year 1935; not only our Society, but most of the entomological organizations of the South of England will have cause for deep regret.

Mr. Adkin joined the Society in 1881, and has been an active member right up to the last, filling the chair on several occasions, and it was only a matter of a few months between his last attendance at one of the Society's meetings and his death. He was the author of very many published notes, especially on the micro-Lepidoptera, and his notes and exhibits were always the source of considerable interest at the meetings he attended.

Mr. Adkin's death left a vacancy for a trustee, which has been filled by Mr. J. H. Adkin.

The Society has benefitted under Mr. Adkin's will by his very fine collection of some 1100 lantern slides, and also by the handsome sum of £200.

The mixed extremes of weather made up, in some measure, for the paucity, both in number and species, of insects to be seen during the year, by their general effect of having caused a considerable range of variation. The severe frost experienced in May cut back the young foliage, so that there was often not enough food for insects to permit of much satisfactory field work, and the earlier field meetings did not meet with the hoped for measure of success. Fortunately things mended somewhat as the year wore on, and the later meetings, if not productive of much in the way of quantity, at least gave rise to many interesting observations.

There were twenty-two meetings and the Annual Exhibition; thirteen papers were read by, Mr. M. Niblett, Mr. R. Adkin, Mr. W. H. T. Tams, Mr. G. A. Brett, Dr. G. A. Metcalfe, Mr. H. R. Hewer, M.Sc., D.I.C., Major H. C. Gunton, M.B., H. B. Williams, LL.D., Mr. E. J. Bunnett, M.A., Mr. F. J. Coulson, K. G. Blair, D.Sc., and Mr. E. J. Bedford, F.P.S. Short papers were also read by Mr. S. Wakely and Mr. J. A. Downes, on the evening allotted

or that purpose, and it may be said that such an evening proved to be a most successful innovation.

The average attendance at meetings was forty-one.

The annual exhibition, which took place on the 24th October, was thoroughly successful; the attendance as recorded reached 256, and there were probably some who did not sign the book. The revival of old acquaintances and the making of new was a prominent feature of this, the most sociable, of the Society's meetings during the year. The exhibits were many and varied, and although it is to be regretted that the usual section of vivaria was absent, there were very interesting exhibits, mostly Lepidoptera, although other orders received a share of attention as did photographs, Lantern Slides and drawings. Judging from the material exhibited, lepidopterous varieties seem to have been unusually plentiful, possibly, as mentioned before, the result of the varied weather conditions obtaining during the year. The arrangement of the tables in smaller blocks was further developed and the circulation of visitors was freer; the catering and organization were both worthy of the Society's approbation.

There were eleven Field Meetings:—Effingham, Box Hill, Brentwood, Broadwater Forest, Forest Row, Bookham Common, Thames Marshes, Leith Hill, Eynsford, and Byfleet, led by Messrs. T. R. Eagles, J. A. Downes, B.Sc., C. G. M. de Worms, M.A., E. E. Syms, Dr. G. V. Bull, Dr. K. G. Blair, F. J. Coulson, C. N. Hawkins, R. W. Attwood, and S. N. A. Jacobs, and although these meetings were not as productive as might have been hoped they were consistently well attended. The leaders read interim reports of their meetings, the full reports appearing in the Proceedings and Transactions for the year.

The membership is now 256, consisting of 209 full members, 40 country members, 2 honorary members and 5 life members; there have been 18 elections, 2 resignations, 4 deaths, and 1 written off for non payment of subscriptions.

The Finances of the Society still remain in a healthy condition, and it is with regret that we have to announce that the Treasurer, who has so successfully guided the Society's finances for many years, feels himself compelled to relinquish his office.

The year's Balance Sheet, duly audited by Messrs. T. R. Eagles and W. J. Watts, is still a cheerful document, and has been read to

you. It is to be hoped that members will keep it well in mind that the Treasurer is an honorary official, and will save him unnecessary work by remembering to pay their subscriptions when due, that is 1st January, thus obviating an undue amount of correspondence.

Material for exhibits may have been somewhat lacking during part of the season, but this was certainly not the case with regard to the care with which exhibits were prepared, and it is much to be regretted that interesting notes were on many occasions lost through the failure of many members to extend this care a little further by putting their notes on paper for the use of the Editor.

The Society was represented at the fiftieth anniversary of the Dublin Field Naturalists' Association in Dublin by Miss W. M. A. Brooke, whose report will appear in the year's volume of Proceedings and Transactions.

Mr. Hy. J. Turner represented the Society at the annual congress of the South-Eastern Union of Scientific Societies.

The volume of Proceedings and Transactions for the season 1934/35 appeared later in the year than usual owing to the regrettable illness and subsequent death of one of the assistant editors; it consists of 149 + xx. pp., and contains papers of both general and particular interest as also the reports of Field Meetings, and of the various congresses.

The Curator reports that "donations to the Society's collections were made by Mr. E. E. Syms, Diptera; Dr. K. G. Blair, Coleoptera; Mr. C. N. Hawkins, 2 *Boletobia fuliginaria*; Mr. H. Worsley Wood, 7 *Bryophila impar*; Dr. G. V. Bull, Hemiptera; also a collection of microscope slides, principally of entomological dissections, under the will of the late Mr. Rayward of Eastbourne."

The Librarian reports: "During the year there has been an increase in the number of borrowers and also in the number of books borrowed. A list of Standard Works not in the library has been prepared."

The following additions to the Library were recorded:—

Books.—Diptera of Patagonia and Chile, 2 pts. (Brit. Mus.); Supp. to Tutt's Br. Noctuae, H. J. Turner (the author); Naturalists Library (Tonge); Argentine Hesperidae, K. J. Hayward (the author); Argentine Nat. Campaign against the Locust; Generic Names (B.M.); Ent. Beiheft Deut. Ent. Ins. Pt. I.

PROCEEDINGS, TRANSACTIONS, REPORTS, ETC.—Bull. and Ann. Soc. Ent. de France; Ann. Rept. of the Smithsonian Inst.; Bull. R. Scuola d'Agric., Portici, Italy; Rept. U.S. Nat. Museum; Jnl. Com. and Foot. Pres. Socy; London Naturalist; Trans. and Proc. Socy. of Br. Entom.; Rept. Hastings and E. Sussex N. H. Socy.; Proc. Norfolk and Norwich Nat. Science Socy.; Proc. I. of W. Nat. Hist. Socy.; Rept. of Conf. of Del. of Corres. Socs. to Br. Assn.; Essex Naturalist; Mem. Connect. Ac. Sci.; Trans. Leicester Lit. and Phil. Socy.; Trans. Connect. Ac. Sci.; Proc. R. Irish Acad.; Early Reports S. L. Socy. (Champion).

PERIODICALS.—Entom.; E.M.M.; Entom. Rec.; Nat. Hist.: Can. Ent.; Ent. News; Vasculum.; Revista Ent. Soc. Argentine; Folia Zoologica, Riga; Acta. Mus. Zool. Athens.

SEPARATES.—Irish Acad.; Chasa Inst. (Japan); Cat. Amer. Birds (Chicago); U.S. Museum pamphlet; Colorado Coll. Pubns.; Lord Walsingham Papers (B.M.)

HON. TREASURER'S REPORT, 1935.

Once again I am pleased to be able to report that the finances of the Society are in a healthy state. It is standing firmly on its feet and is able to meet its liabilities year by year.

Our outgoings for the past year amount to £195 12s. 6d., and our income from all sources to £210 1s. 1d., giving us a surplus of £14 8s. 7d.—and as we invested £15 6s. 0d. out of the balance brought forward last year to the credit of suspense account, we are well on the right side.

To take the items in detail as compared with last year our income from Subscriptions is £9 up, and from refreshment fund donations nearly £4 up, a record figure.

Entrance fees were 7/6 lower.

Donations to publication fund £1 higher.

I am sorry to have no item for sales of proceedings, but the librarian informs me that this is because the people who bought have not yet paid for their purchases.

The most important item of the year was the bequest made to us under the will of the late Robert Adkin of £200 free of duty which we have invested in 3½% Conversion Loan.

On the other side of the ledger our expenses as compared with last year are as follows—

Rent, Insurance, Income Tax and Attendance are of course the same. Secretarial and Treasurer's expenses about £1 higher, as is also the item of catering.

We have bought an Addressograph machine for £2 5s. 0d. to help our Secretary to get through his heavy work, and we spent 30/- on a wreath for Mr. Adkin.

Printing Proceedings was £23 lower, there being no half tone blocks this time. In the past they have been given to the Society as a donation.

We purchased fewer books than last year, and spent rather less on binding, the difference in cost amounting to nearly £18.

The balance sheet shows an excess of assets over liabilities amounting to £1193 5s. 0d. and this would have been higher but

[Continued on p. xx.]

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

STATEMENT OF ACCOUNTS FOR THE YEAR 1935.

REVENUE ACCOUNT.

<i>Expenditure.</i>	£ s. d.		<i>Income.</i>	£ s. d.
To Rent of Rooms	50 0 0	By Subscriptions:—		
" Insurance	1 10 9	Current .. .. .	..	109 5 0
" Income Tax	2 7 3	Arrears .. .. .	..	22 5 0
" Attendance	2 10 0	In advance .. .. .	..	16 0 0
" Secretarial Expenses	8 18 10			147 10 0
" Treasurer's	1 6 8	Dividends:—		
" Catering	21 10 0	On 4% Consols .. .. .	..	6 3 8
" Addressograph machine	2 5 0	" 3½% Conv. Loan .. .. .	..	10 12 6
" Wreath	1 10 0			
Subscriptions.	91 18 6	" Refreshment Fund Donations .. .. .	..	16 16 2
South-Eastern Union of S. Societies	7 6	" Deposit interest .. .. .	..	19 3 1
Commons and Footpaths Preser-		Balance brought forward .. .. .	..	0 12 4
vation Society	10 6			42 12 11
Grants to	0 18 0			
Publication Fund	75 0 0			
Library Fund	11 0 0			
Balance carried forward.. .. .	86 0 0			
	47 18 0			
	£226 14 6			£226 14 6

LIBRARY FUND.

	£ s. d.		£ s. d.
To Books purchased	5 6 8	By Balance brought forward .. .. .	..
" Bookbinding	1 12 0	" Grant from General Fund.. .. .	..
" Sub. to Ent. Mo. Mag.	0 15 0		
" Librarian Expenses.. .. .	3 4 6		
	10 18 2		
" Balance carried down	1 18 2		
	£12 16 4		£12 16 4

	£ s. d.		£ s. d.
To purchase of £200 3½% Conversion Loan at £107½ & 21/- Cost..	.. 215 6 0	By balance brought forward ..	.. 17 10 3
To Balance carried forward..	.. 3 19 3	Bequest under the Will of the late Robert Adkin ..	.. 200 0 0
		Entrance fees ..	.. 1 15 0
			£219 5 3

PUBLICATION FUND.

	£ s. d.		£ s. d.
To Printing Proceedings ..	.. 91 17 10	By Balance brought forward ..	.. 1 13 0
„ Balance carried forward ..	.. 0 14 8	„ Donations ..	.. 5 9 6
		„ Dividends on 3½% War Loan ..	.. 10 10 0
		„ Grant from General Fund..	.. 75 0 0
			£92 12 6

XIX

BALANCE SHEET.

	£ s. d.		£ s. d.
To Balance, being excess of assets over liabilities	1193 5 0	By Balances—	
		Revenue a/c ..	47 18 0
		Suspense a/c ..	3 19 3
		Publication Fund ..	0 14 8
		Library Fund ..	1 18 2
		„ Investments at current quotations	54 10 1
		£300 3½% War Loan at 106½	318 11 3
		£391 3½% Con. Loan at 108 ..	422 5 7
		£200 3½% Con. Loan at 108 ..	216 0 0
		£154 4% Consols at 114½ ..	176 18 1
		„ Subscriptions unpaid :—	1133 14 11
		Good	4 0 0
		Doubtful or bad	6 0 0
		worth say	5 0 0
			£1193 5 0

Examined and found correct, this 18th January, 1936.

W. J. WATTS }
T. R. EAGLES } *Auditors.*

for the method of valuing the invested capital of the Society at current prices. Quotations for Government stocks were lower this year than last making a difference in the balance sheet figures of £35. But after all this is only a paper difference as our investments all stand at or about the purchase price.

I presume you would not wish me to bore you with the details of the statement of accounts here, but I will hand them to the Secretary so that any one can see them who wants to, and they will in due course be published in the Society's proceedings. They have been audited by Messrs T. R. Eagles and W. J. Watts, to whom I tender my sincere thanks for their trouble in doing so.

It is with great regret that I have come to the conclusion that the time has now arrived for me to hand over my duties to my successor. For the past 17 years I have taken great pride and pleasure in keeping the Society's accounts and have seen it grow from a puny weakling, needing a great deal of outside help, to a strong and vigorous maturity.

Unfortunately A.D. in the form of physical limitations has turned what used to be a pleasure into a severe burden. I therefore feel compelled to resign and Mr. T. R. Eagles has been appointed by your council to succeed me. I wish him every success in his new office and hope that he will get as much pleasure out of it as I have done. I also tender my sincere thanks to the Presidents, Officers, Council and all the other members of the Society for their kindly support and co-operation during my period of office.

Robert Adkin. 1849-1935.

In the passing of Robert Adkin the Society has lost a member, who for more than half a century had been closely associated with all its activities. He was born in Lewisham on 4th January, 1849, and on 21st May, 1935, after several months of failing strength, he faded away. Thus he had commenced his 87th year; and during this long life he enjoyed the advantage of exceptionally good health.

From an early age he is stated to have taken a keen interest in insect life and no doubt soon came under the influence of Stainton, who lived not far distant from his early home. In the autumn of 1881 he joined this Society and almost from the first took the keenest interest in its progress and welfare, and the position the Society now holds is largely due to his efforts. We find that as early as 1883 he became a member of the Council and records of his first exhibits and early donations to the collections will be found in the Society's "Proceedings" of that period.

Mr. Adkin was brought up to the business of a tobacco merchant and became a partner in the well known firm, Adkin Bros. of Aldgate, London, E.C., which had been founded by his family in the early part of last century. In 1901 his firm entered into association with the Imperial Tobacco Company and for many years previous to his death he was a member of the Control Board of this great concern, from the meetings of which he was never absent.

Quiet, modest and unassuming, with a quick grasp of matters in which he took an interest, he soon gained the confidence of all who came in contact with him, either in private life, or in business connection.

For the greater part of his life he lived at Lewisham, and there year by year he was accustomed to entertain the Officers of the Society at a supper and conversazione, and a privilege it was to be one of those who were present. His election to that select band of eight eminent entomologists, the Entomological Club, afforded further opportunity to ask active members of the Society and others to meet the Club members and friends at another conversazione. In 1915 he removed to Eastbourne, where he had bought the house of the late Professor Huxley. There he continued to manifest the

pleasure it gave him to have his entomological friends around him ; but home accomodation soon proved too small and the meetings were held in the Grand Hotel, and comprised lunch, a field ramble, conversazione and supper.

For many years at frequent intervals Mr. Adkin was a member of the Council of our Society and several times he held the office of President, besides which for a number of years he was Hon. Treasurer, and thus for the greater part of fifty years he was officially guiding the destiny of the Society. Even the removal to Eastbourne did not keep him from the meetings, for only pressing business engagements taking him away from London could, even at his advanced age, prevent him from joining us.

While living at Lewisham he identified himself with the Field Meetings of the Society and was present at most of them from the time of their adoption as a feature of the work of the Society.

He was a most frequent exhibitor at the ordinary meetings, and often his exhibit served to demonstrate some new fact concerning a common species, his remarks being always to the point and he never failed to supply a concise but adequate note on the objects of his exhibit.

In Eastbourne Mr. Adkin identified himself at once with the small local Natural History Socy., which in a short time came to feel the spell of his influence. He became a councillor and finally President. Under the auspices of this Society he compiled, from the records of its members and largely from his own observations of many years, three small volumes on the Lepidoptera of Eastbourne illustrated by maps and a large number of plates. This was the only serious publication he took in hand, but the many valuable notes, recording his experiences and observations, which appeared from time to time in our own publications and in the "Entomologist" (of which journal he became part proprietor on the death of the former owner, Mr. R. South) are ample evidence, both of his wide knowledge and of that thirst for first hand information, which characterised his Entomological work.

Until he was unable to carry on in early 1935, Mr. Adkin took a leading part in the work of preparing and editing the "Proceedings" of our Society. His study of the proofs was most thorough, to which the aid of his very valuable library of entomological and general natural history books was most opportune. For many years he had made himself largely responsible for the provision of plates in the "Proceedings," but his modesty withheld

his generosity from being known to all but a few of our members. Often when it seemed desirable that the Society should have additional equipment, which our funds did not allow, the desire was quietly attained but with a request for no official acknowledgment.

In 1885 Mr. Adkin became a member of the then Entomological Society of London, at that time housed in rather close quarters in Chandos Street, near Oxford Circus. In course of time he was put on the Council of this Society and was on occasion a Vice-President. For years he was either on the Council or on one of its official Committees. In arrangements for the removal of the Society to permanent quarters at Queen's Gate during the Treasurership of Mr. W. G. Sheldon, Mr. Adkin took a leading part and strongly supported the financial scheme to meet the large expense. When the repayment of the debentures issued became due, he set an example of cancelling his own share, which, with the support of others, enabled the debt incurred to be liquidated within a much shorter period. Nor did his material assistance to the Society end here; he knew that it was necessary for the more effective demonstration of exhibits, that a costly epidiascope should be supplied, and it was donated with all necessary fittings without charge to the Society. Much as the Fellows wished to make him their President as a mark of their profound gratitude, his modesty repeatedly made him refuse, in fact he even appeared annoyed that he was asked to be at the head of this great Royal Entomological Society.

With the South Eastern Union of Scientific Societies he was associated almost from the commencement. There is no doubt he was influenced in this undertaking by his great friend the late G. T. Porritt whose influence in the strong Yorkshire Naturalists Union suggested a similar development for the new Southern Union. In the first list of Members, issued in 1898, we find his name, and this was succeeded the following year by his entering the Council. His unobtrusive but modest practical and businesslike suggestions invariably carried much weight in the early development of the Union and eventually he became Treasurer, which office he held for 22 years. He was an advocate of the division into Sections and this was carried out, but it was not until 1922 that his particular desire, a Zoological Section, was formed, at the Annual Congress at Southampton. He saw that our Society was always represented at the Annual Congresses of the Union.

He was one of the Vice-Presidents of the Ray Society for the publication of valuable Natural History Memoirs, a member of the

National Trust for the Preservation of areas of special beauty and interest, a member of the Commons and Footpaths Preservation Society, and quite recently he joined the ranks of the recently formed Society for British Entomology.

During his whole life he was devoted to the study of Lepidoptera and, even during the last few years of his life, when he felt unable to do continued and strenuous field work, he installed a light trap and followed it up enthusiastically. He confined his collecting to the British Lepidoptera, both Macro- and Micro-, many species of which he had bred. His collection he has bequeathed to the British Museum (Natural History), S. Kensington. To our cabinets he made many contributions to fill gaps and to add useful forms for reference. His Library was a remarkably complete one from a British Lepidopterist's view and contained also the most valued works of continental origin useful for reference in his study of our native lepidoptera. Nor was his library deficient in works on other groups, where such works would be of practical use in the preparation or correction of the "Proceedings" of our Society, always a matter of earnest solicitude with him. Useful works were continually being added to the reference library of our Society, and several hundred volumes not previously on their shelves have been bequeathed to the Royal Entomological Society. The name of Robert Adkin is enshrined in the annals of our Society for ever.

ABSTRACT OF PROCEEDINGS.

14th FEBRUARY, 1935.

Mr. E. E. SYMS, F.R.E.S., PRESIDENT, in the Chair.

Dr. E. A. Cockayne exhibited a short series of *Abraxas grossulariata*, L. ab. *lacticolor*, Rayn. (sex-linked recessive) and the Q variety (autosomal recessive), with notes. From various crosses of these two strains Woodlock obtained three pairings, which should have produced the double recessive. The first, in which one in four females should have been a double recessive, gave 4 male and 2 female *grossulariata*, 3 male and 3 female Q, and 4 female *lacticolor*. The second, in which one female in eight should have been a double recessive, gave 15 male and 3 female *grossulariata*, 7 male Q, and 5 female *lacticolor*. The third, in which one in four females should have been a double recessive, gave 1 male *grossulariata*, 1 female Q, and 2 female *lacticolor*. One would expect the double recessive to be much lighter than either *lacticolor* or Q, since it lacks two genes for large spots. Possibly the double recessive is delicate and none was bred.

For comparison with these two forms there are two very lightly marked *grossulariata*, a male and female, the former from a North London larva; the spots are small and ill-defined, being formed of fine transverse striae, and the ground colour is creamy as in *lacticolor*, not white as in Q. It is unlikely to be a variant of *lacticolor*, since a male was bred from a wild larva from London where *lacticolor*, if it occurs at all, is very rare. This third form seems to be distinct from both Q and *lacticolor*.

Dr. G. V. Bull exhibited four specimens of *Lasiocampa quercus*, L. f. *callunae*, Palmer, bred in 6 months from the date of oviposition. The parent was a ♀ taken in the New Forest on 31st July, 1934. Ova hatched 18th August, first cocoon spun 18th November, first emergence 4th January, 1935, others on 11th, 15th and 20th January.

Dr. K. G. Blair exhibited some larvae of *Nacerda melanura*, L., sent for determination by Mr. T. R. Goddard, curator of the Hancock Museum, Newcastle-on-Tyne. The larvae were found in pitch-pine piles which have been enclosed in brickwork and cement, since

January 1915, to a depth of 5 feet below floor level. The sender suggests that the eggs or young larvae must have been in the piles when they were driven twenty years ago.

Mr. Bliss exhibited specimens of *Spilosoma menthastri*, Esp. Two were slightly banded and one very heavily spotted.

The Secretary then read a Paper by Capt. K. J. Hayward (Argentine) "Six Months Collecting along the Alto Parana, Argentine," and a number of excellent photographs of the wonderful Falls of Iguazú, were passed round. (See Trans.)

28th FEBRUARY, 1935.

The PRESIDENT in the Chair.

Mr. McDonogh, D.Sc., 36, Elvaston Place, S.W.7, and Mr. A. V. Hedges, Milton Ernest House, Milton Ernest, Beds. were elected members.

The President exhibited the Dipteron, *Microdon mutabilis*, L., of which the larva lives in the nest of the ant *Acanthomyops niger*, L.

Mr. Dannatt exhibited the exotic Lepidoptera *Danaïs dannatti*, Talb. and *Delias* ssp. *levicki*, Roth.

Mr. Hy. J. Turner exhibited a box of Argentine *Papilio* species to illustrate the paper by Captain Hayward read on 14th February.

Mr. W. H. T. Tams gave an Address with lantern slides, "An Expedition to Fernando Po."

14th MARCH, 1935.

The PRESIDENT in the Chair.

Miss Kirby, of Chiswick, and Mr. L. H. Tomkins, of Worcester Pk., were elected members.

Dr. Cockayne exhibited a short bred series of *Leucania albipuncta*, Fb., from ova laid by a female taken in September at Swanage, showing both buff and red forms, and a full grown larva.

Mr. Hy. J. Turner exhibited a number of species of *Pieridae* in further illustration of Capt. Hayward's recent paper.

Mr. Eagles exhibited small branches of poplar containing the living larvae of the Coleopteron, *Saperda carcharias*, L. from Formby, Lanes, where it was apparently very prevalent and destructive.

Mr. Wakely exhibited specimens of *Myelois neophanes*, Dur. and read the following note:—The complete life-history of this species is unknown. Meyrick in his 1928 *Handbook* says: "The late Dr. David Sharp sent me some dark, smoky-grey larvae, with scattered whitish hairs and dark fuscous head, feeding in September on globular black fungus growing on stems of *Ulex* in the New Forest, Hants, which may not improbably have been this species, but we both failed to rear the imago."

The particulars of two bred specimens recently given me are of interest. The first, bred by Mr. E. J. Bunnett from the fungus *Daldinia concentrica*, Grev., is labelled "From *Daldinia*, 5-x-17." No doubt this refers to the date the fungus was taken. The locality is unfortunately unrecorded, but the fungus was definitely not growing on gorse. I have to thank Mr. Bunnett for the two excellent photographs of this fungus which are being shown to-night. It is undoubtedly the "globular black fungus" mentioned by Meyrick, and is a striking species.

The second specimen came from Mr. T. R. Eagles, who found the larva in a hollow birch twig at Byfleet, Surrey, on 29th July, 1933, at one of the Field Meetings. It showed signs of being about to pupate, and had evidently selected this hollow twig for the purpose. The moth emerged the following year on 12th July. It seems likely by these dates that this specimen was at least two years in reaching maturity. Both the above are females.

The third specimen shown, a male, was beaten out of a fir tree at Broadwater Forest, Sussex, on 19th June, 1932.

Two other species are also exhibited which have a superficial resemblance to the insect under discussion. These are *Salebria betulae*, Gze. and *Salebria fusca*, Haw. The latter is a larger insect, and occurs among heather. *Salebria betulae* occurs among birch, and *Myelois neophanes* is easily mistaken for this species. The hindwings of *M. neophanes*, however, are much paler than in *S. betulae*. The male antenna of this last species has a thickening at the base, thereby differing from *M. neophanes*. The late Mr. J. H. Durrant, of the British Museum, was responsible for placing *M. neophanes* on the British List, and there is a short series in the Banks' Collection at South Kensington with a note stating they were found among the preceding series. All three species are very local in distribution. A full description of the larva and its habits is a task still waiting to be accomplished.

Mr. Brett exhibited his series of *Hemerophila abruptaria*, Thnbg.,

which were the subject of his paper subsequently read, and also specimens of the cages he used in his experiments.

Mr. Buckstone exhibited four examples of *Polygonia c-album*, L. from Surrey and Sussex, each having a row of blue spots on the upperside of the hindwings.

Mr. C. W. Harris exhibited *Cerura bicuspis*, Bork. taken in Broadwater Forest in June, 1934, and the dark form ab. *nigrina*, Weym. of *Limenitis camilla*, Schiff. (*sibilla*, L.) taken at Forest Row in July, 1934.

Mr. J. A. Downes summed up results of the breeding of *Selenia tetralunaria*, Hufn. in 1933-4 as follow.

SUMMER BROOD 1933.

BRED BY.	Cockayne.	Hawkins.	Fletcher.	Downes.
TIME OF EMERGENCE.	Sep.	Aug.-Sep.	June-July	July
CONDITIONS OF REARING.	—	'cool room', 'closed box'	'airy cage'	—
APPEARANCE OF SPECIMENS.	like spring brood approximately.		near summer brood.	summer brood.

Assuming that late emergence (C. and H.) indicates long life-history and cool conditions, as seems likely, *i.e.* indicates *spring-brood conditions*, the summer brood facies is chiefly due to immediate environment and not to heredity.

Mr. Brett read a paper "An Account of some preliminary Experiments with *Hemerophila abruptaria*, Thnbg." (See Trans.)

28th MARCH, 1935.

The PRESIDENT in the Chair.

The decease of Col. R. H. Rattray, a member since 1922, was announced.

Mr. Collins, of Kingswood and Mr. Ensor, of London, S.W.16, were elected members.

Mr. Oliver exhibited a remarkable aberration of *Strymon (Thecla) w-album*, Knoch. of a bronze buff colour, bred from one of five full grown larvae beaten near High Wycombe in 1919.

Mr. Turner exhibited a further series of the Lepidoptera of the Argentine, mainly Danaiids, to illustrate Capt. Hayward's paper.

Dr. Metcalf gave a Lecture on "The Birds of Northern Ireland," illustrated with a large number of lantern slides.

11th APRIL, 1935.

The PRESIDENT in the Chair.

Mr. Priske exhibited the gall-maker of the common "oak apple" gall, *Teras terminalis*, Mhl. and 2 Chalcid parasites, which had appeared after two years.

He also showed several coloured mice and said that a ♂ black mouse, the offspring of two black mice, was paired with a ♀ red mouse, the offspring of two red mice. Of the resulting offspring, six in number, five were a very decided mixture but the sixth was red like the mother.

Mr. Stanley Smith exhibited comparative series of *Hyloicus pinastri*, L. from different localities.

Mr. Hy. J. Turner exhibited a fine pair of *Ornithoptera victoriar-regis*, Roths. from Bougainville, one of the larger islands in the Solomon group; also a series of temperature forms of *Nymphalis antiopa*, L. including f. *hygiea*, Heydr., f. *roederi*, Stndf., f. *artemis*, Fisch., f. *epione*, Fisch. and f. *daubei*, Stndf.

Mr. O'Farrell exhibited a set of photographs of Natural History objects and described his method of work as follows:—

"Some notes on Photomicrography with an ordinary box camera. The photographs which I am showing to-night are the results of some experiments with an old camera and a small microscope.

"Although I don't suppose my methods will be of great interest to expert photographers, I think perhaps a short description of them may be of interest to people who, like myself, know very little of scientific photography.

"The microscope is fastened by adjustable screws to a baseboard consisting of a $\frac{1}{2}$ " plank, 36" \times 8". The screws are necessarily adjustable since otherwise the microscope would have to be permanently fixed in position which is obviously undesirable. The direct light from a 100 Watt pearl bulb is used. The lens of the camera is applied to the eye piece of the microscope, light leakage being checked by a tube of velvet fitting on to the eyepiece of the microscope and glued to the front of the camera. The camera is screwed to a wooden block sliding on rails: this block may be made hollow and used as a receptacle for spare films, etc.

"Using an ordinary roll-film camera, the chief difficulty is naturally in focussing accurately. The method which I have adopted is as follows:—The microscope is focussed on a given slide in the ordinary way: it is then placed in position on the baseboard and

the light switched on: a blurred image will be produced on a ground glass screen at the back of the camera. This blurred image is now clearly focussed by manipulating the fine adjustment of the microscope, the number of turns of the screw necessary to produce a perfectly clear image on the screen being carefully noted. One can now dispense with the screen altogether; the focussing can always be done in the usual way and completed by giving the fine adjustment an appropriate number of turns after the microscope is in position. Since the number of turns necessary varies with the objective used and with the length of draw-tube, a table should be constructed, giving the number of turns of the screw necessary to give a clear image for each objective at draw tube lengths of, say, 5, 10, 15, 25 cms. This table can then be referred to at any time: the ground glass screen can be dispensed with altogether, and thus one roll of film may be used to take photographs with several different magnifications. The construction of the table is the only troublesome part: the actual apparatus, given an old camera, costs only about four shillings to construct.

"Exposures, incidentally, range from $\frac{1}{5}$ sec. or even less with low powers, to 20 secs. or more with high powers. The exposure required varies, of course, with the type of light used: a 100-watt pearl bulb seems to give the best results in the shortest time."

Dr. Cockayne exhibited a short series of Aberdeen forms of *Abraxas grossulariata*, L.

Mr. Eagles exhibited dark forms of *Acrionicta aceris*, L. from Dagenham, Essex, and a banded form of *Metachrostis* (*Bryophila*) *perla*, Fb. from Littlehampton, Sussex.

Dr. K. G. Blair exhibited living larvae of *Callimorpha quadripunctata*, Pod. (*hera*, L.), from Dawlish, of *Euchloris smaragdaria*, Fb. taken last autumn at Benfleet, and of *Leucania straminea*, Tr. from Oxshott in Aug. 1934.

Mr. Niblett exhibited the following bred examples of gall-making *Cynipidae*—*Andricus sieboldi*, Htg. and galls on *Quercus robur*, L., emerged 3.iii.35; *Andricus glandulae*, Schnk. and galls on *Quercus robur*, L., emerged 23.iii.35.

Dr. C. V. Bull exhibited a form of *Taeniocampa stabilis*, View. in which the orbicular and reniform stigmata were united.

Mr. G. B. Oliver exhibited (1) *Polygonia c-album*, L., a series of undersides showing variation in the "C" mark (C.G.V.O.y.d, etc.) (2) A short series of *Lycaena arion*, L., with empty pupa cases, bred from pupae found in ants' nests in N. Cornwall, 1920. (3) Varieties

of *Brenthis euphrosyne*, L., from the Chilterns of Bucks. and Herts. (1920-2) including russet toned undersides with leaden metallic spotting, and a ♂ with upper and under sides of a mahogany shade.

In remarks on the Season it was noted as abnormally early, *Taeniocampa gothica*, L., *T. incerta*, Hfn. (*instabilis*, Esp.), *Pieris rapae*, L., *P. c-album*, L., *Nymphalis polychloros*, L., *Aglais urticae*, L., *Nymphalis io*, L., etc. were reported and *Lycaenopsis argiolus*, L., had been bred.

13th APRIL, 1935.

FIELD MEETING—EFFINGHAM.

Leader.—MR. T. R. EAGLES.

The first meeting of the year was as usual well attended, there being 22 members and 3 visitors present. In the morning and afternoon the weather was good and conditions for field work were ideal. About tea-time, however, heavy rain set in and sallowing was not attempted.

The general impression was that insects were not so plentiful in the pine and heather area at Ockham as they had been the year before. Nevertheless, when notes were compared it was found that the number of species observed was not short of past years. Among the Lepidopterous imagines were *Lobophora carpinata*, Bkh.; *Brephos parthenias*, L.; *Gonepteryx rhamni*, L.; *Nymphalis io*, L.; and *Eriocrania purpurella*, Haw. The larvae included *Diacrisia sanio*, L.; *Lithosia deplana*, Esp.; *Ellopiia fasciaria*, L. (*prosapiaria*, L.); and *Perconia strigillaria*, Hb. The pine frequenting ladybirds, *Mysia oblongoguttata*, L., *Myrrha 18-guttata*, L., and *Anatis ocellata*, L. (typical specimens and varieties) were in fair numbers.

Sallow catkins were gathered by some of the members and produced larvae of *Xanthia fulvago*, L.; *Amathes circellaris*, Hufn.; and *Eupithecia tenuiata*, Hb.

Flood débris accumulated in a bend of a ditch on the Common was found to harbour an abundance of beetles including *Bembidion biguttatum*, F.; *Acupalpus luridus*, Dej.; *Agonum viduum*, Pz.; *Bythinus bulbifer*, Rchb.; *Scymnus haemorrhoidalis*, Hbst.; and many others.

A specimen of the beetle *Opilo mollis*, L., was found resting in a hollow stick.

Search near a fox which had come to an untimely and unsporting end yielded specimens of the beetle *Necrophorus humator*, Gz. These were taken for the study of their parasites and associated mites.

25th APRIL, 1935.

The PRESIDENT in the Chair.

Mr. S. N. A. Jacobs exhibited the larval cases, and living larvae, of *Tinea pellionella*, L. feeding in feathers: that the enlargement of the cases takes place at both ends was apparent.

Dr. E. A. Cockayne exhibited a further series of forms of *Abraxas grossulariata*, L.

Mr. T. R. Eagles exhibited an example of phyllody in a branch of sallow from Enfield, Middlesex; and also a brown form of the beetle *Cylindronotus laevioctostriatus*, Göze. (*Helops striatus*, Frery.) from Effingham.

Dr. H. B. Williams exhibited series of *Erannis defoliaria*, Clrck., and of *Hemerophila abruptaria*, Thnbrg., neither of the broods exhibiting the depth of dark coloration shown in the strain of Mr. Brett's broods.

The President exhibited an example of the smaller field-cricket, *Nemobius sylvestris*, Fb., a very local species in this country.

Mr. C. N. Hawkins exhibited males of 2 melanic broods of *Erannis defoliaria*, Clk., from Chingford, bred ab. ovo. The actual numbers bred were 50 males and 13 females, all melanic. The male parent was a very black specimen taken 23.xii.33 and the female parents (2) were blacks bred from ova laid by a normal female taken *in cop.* with a melanic male on 17.xii.32. The latter pairing produced, besides the 2 black females mentioned, 4 non-melanic females and 2 non-melanic males.

Mr. C. J. Coulson exhibited the beetles (1) *Rybaxis sanguinea*, L. ab. *nigripennis*, Gerh. taken at the Field Meeting, Bookham, 9th June, 1934 (a black aberration: one specimen from amongst a large number of the normal red form).

(2) *Phyllobius pyri*, L. one specimen; possibly ab. *respertinus*, Fb., taken from whin, Wimbledon Common, May 1927. Its peculiar characters appear to be shortened antennae and legs. (Both determined by Dr. Blair).

Also (3) representatives of species taken at the Effingham Meeting, 13th April, 1935—particularly those taken in accumulated debris (flood refuse) at the bend of a ditch.

Mr. G. B. Oliver exhibited several aberrations of *Aglais urticae*, L., to illustrate the difference between wild and bred examples of the same aberrational forms.

Dr. H. R. Hewer, M.Sc., read a paper, "New Evidence on the Lamarckian Theory," dealing with the results obtained in controlled breeding experiments with rats and stick-insects.

9th MAY, 1935.

The PRESIDENT in the Chair.

Mr. Niblett exhibited the Coleopteron *Megatoma undata*, Er., bred from a gall of *Rhabdophaga salicis*, on *Salix cinerea*, L., and from a flower-head of *Carduus crispus*, L.: emerged 19.iv. and 5.v.35, respectively.

Mr. Wakely exhibited larvae of *Mellinia* (*Xanthia*) *gilvago*, Esp. and of *Strymon* (*Thecla*) *w-album*, Knock. from wych elm near Croydon, with larvae of *Acidalia immorata*, L. from ova.

The President exhibited the Hemipteron *Triecphora vulnerata*, Ger. from Surrey.

Major H. C. Gunton gave a lecture on Phenological Observations; illustrated by lantern slides.

Dr. Cockayne exhibited a tabulated statement of dates of emergence of various species of Lepidoptera.

11th MAY, 1935.

FIELD MEETING—BOX HILL.

Leader.—B. J. MacNULTY.

The weather was bright and sunny, and the absence of wind made the beating on the slopes of Box Hill more attractive than on many occasions in the past.

Some eight or nine members assembled at Box Hill station at 10.30 and after waiting for a few minutes, for any others who might be arriving late, commenced operations.

During the morning the party worked the woods along the ridges

of Box Hill towards the top, where lunch was taken at one o'clock by two members of the party, the rest having failed to appear.

After lunch the party made its way down into Juniper Valley in twos and threes and were then joined by the main body of the afternoon party.

The members were well spread out over the area, and it was thus impossible to estimate the numbers present until tea time. The party assembled in the Railway Arms for tea at 5.30, where we found that the number had increased to 30: 26 members and 4 visitors.

Perhaps the capture, which aroused the most excitement, was a perfect specimen of *Selenia tetralunaria*, Hufn. Other imagines captured were *Pieris brassicae*, L., *P. rapae*, L., *Euchloë cardamines*, L., *Gonepteryx rhamni*, L., *Vanessa io*, L., *V. urticae*, L., *Erynnis tages*, L., *Callophrys rubi*, L., *Hesperia malvae*, L., and larvae of *Epinephele jurtina*, L. *Ligdia adustata*, Schiff., *Anaitis efformata*, Gn., *Hemerophila abruptaria*, Thnbg., *Xanthorhoë fluctuata*, L., *Euclidia glyphica*, L. and larvae of *Lithosia deplana*, Esp. (*depressa*, Esp.), *Boarmia ribeata*, Clrck. (*abietaria*, Schiff.), *B. repandata*, L., *Eupithecia sobrinata*, Hb. and *Nola cucullatella*, L. Dr. Blair reported an ovum of *Lophopteryx camelina*, L. on birch and larvae of *Pterophorus galactodactyla*, Hb. on burdock, *Arctium lappa*, L. (*minus*, Bernb.). Among the Micro-lepidoptera were *Pyrausta purpuralis*, L., *P. aurata*, Scop., *Ennychia* (*Pyrausta*) *cingulata*, L., *Phoxopteryx* (*Ancylis*) *comptana*, Forst., and *Cnephasia virgaureana*, Tr.

Dr. Blair also reported the Coleoptera *Cassida fastuosa*, Schal. and ova on *Inula conyza*, Dc., *Cryptocephalus coryli*, L. on birch, and *Longitarsus obliteratus*, Rosh. (*pulex*, Schr.) on short herbage; the Hemiptera *Cixius pilosus*, Ol. and ab. *albicincta*, Germ.; and *Forficula auricularia*, L., a peculiar ♀ with no wings visible beyond the elytra. On closer examination the wings appear to have been nibbled off level with the elytra.

Mr. F. T. Grant furnished the following List of Coleoptera noted by himself. *Adalia obliterata*, L., *Coccinella 7-punctata*, L., *Halyzia 14-guttata*, L., *Telephorus haemorrhoidalis*, Fb., *Timarcha violaceo-nigra*, DeG., *Chrysomela goettingensis*, L., *Lochmaea crataegi*, Frst., *Hermaeophaga mercurialis*, Fb., *Plectroscelis concinna*, Marsh., *Anaspis rufilabris*, Gyll., *A. maculata*, Fourc., *Rhynchites aequatus*, L., *Polydrosus micans*, Fb., *P. cervinus*, L., *Phyllobius oblongus*, L., *P. urticae*, DeG., *Orchestes quercus*, L., *O. fagi*, L., *Anthonomus pedicularius*, L., *Cistela luperus*, Hbst., and var. *ferruginea*, Fb.

19th MAY, 1935.

FIELD MEETING—CHILWORTH ST. MARTHA'S.

Leader.—Dr. C. G. M. DE WORMS, F.R.E.S.

The Field Meetings in this locality in the two previous seasons were held under ideal conditions of warmth and sunshine. It was too much to hope that the third occasion would be so propitiously favoured. One of the most severe May frosts on record had just been experienced, doing untold damage to insect and plant life. Notwithstanding these drawbacks, some dozen members of the Society decided to brave the elements. The party moved off about midday from the station at Chilworth under a very threatening sky. The route taken was by the spruce wood bordering the mill where the first halt was made. Here a few *Thera variata*, Schiff. and *Eupithecia tantillaria*, Bdv. (*pusillata*, Hb.) were found at rest or beaten from the spruce branches.

On leaving this spot rain began to fall and it soon became obvious that it had set in for the rest of the day. However, most members decided to ascend the slopes of St. Martha's, by which time a deluge was coming down and both beating and searching became almost impossible. A sprinkling of half-grown larvae of *Thecla w-album*, Knock. and *Brachionycha sphinx*, Hufn. (*cassinea*, Hb.) were obtained by the more enthusiastic collectors, but most of the party found it more prudent and congenial to take refuge in a small cattle shelter. Owing to the relentless downpour the outing was curtailed and the party made the most of a very welcome and excellent tea in the Station hotel.

23rd MAY, 1935.

The PRESIDENT in the Chair.

The decease of Mr. R. Adkin, one of the oldest members of the Society, was reported. (See Trans.)

Dr. Cockayne exhibited dark larvae of *Philereme transversata*, Hufn. (*Scotosia rhamnata*, Schiff.) like that figured by Buckler, taken at the Box Hill Field Meeting and a green larva for comparison. Also an aberration of *Abraxas grossulariata*, L., similar to one figured by Newman in his British Moths.

Mr. Stanley Smith exhibited larvae of *Mellinia (Xanthia) ocellaris*, Bork.

Mr. Priske exhibited long and varied series of British freshwater shells.

Dr. Bull exhibited a short series of *Taeniocampa gothica*, L. with f. *gothicina*, H.-S. from Aviemore. He also communicated the following dates of appearance for West Kent. *Brenthis euphrosyne*, L., 6th May; *Hemaris fuciformis*, L., 10th May; *B. selene*, Schiff., *Hamearis lucina*, L. and *Rumicia phlaeas*, L., 20th May.

Mr. S. Wakely exhibited larvae of *Stenoptilia bipunctidactylus*, Haw., from Chilworth; larvae of *Alucita spilodactylus*, Curt., from the Isle of Wight, on *Marrubium vulgare*, L.; larvae of *Teichobia (Psychoides) verhuellella*, Stain. (Heyd.), from the same place, in the fructification of ferns; and larvae of *Oxyptilia heterodactyla*, Vill. (*teucii*, Jord.) from Box Hill on *Teucrium scorodonia*, L.

Mr. H. W. Andrews exhibited the rare Diptera (Tachinids), *Echinomyia ferox*, Panz., from North Kent and the Isle of Wight, and *Trixa alpina*, Mg., from N. Kent.

Exhibition was made of various forms of Aquatic Life. The water plants *Utricularia intermedia*, Hayne. (Lentibulariae); *Ricciocarpus natans*, C., a Liverwort species; larva of a species of *Anopheles* (Mosquito) found in the stagnant water hollows at the foot of trees; and larvae of *Stratiomys furcata*, F. (Dip.)

1st JUNE, 1935.

FIELD MEETING—BRENTWOOD.

Leader.—E. E. SYMS, F.R.E.S.

The weather was unfortunately against us at this Field Meeting, yet it was a successful gathering. The four members who travelled down in the morning found everything saturated and, to make things worse, the frost late in May had badly damaged most of the young oak trees. The rain continued up to lunch time, but after that the sun came out and collecting became much more pleasant. Mr. Wakely, who came down in the afternoon, on his way up from the station visited a coppice, in which were a number of wych-elms, and from these he obtained larvae of *Strymon w-album*, Knoch. This capture he reported on his arrival and it was decided to visit these trees after tea. Those who did were most successful, obtaining as many larvae as they required. The members spent most of the time searching for Lepidopterous larvae, and the following species

were reported to have been taken:—*Strymon w-album*, Knoch., *Orgyia gonostigma*, Fb., *Hylophila bicolorana*, Fuess., *Lithosia complana*, L., *Brachionycha sphinx*, Hufn., *Taeniocampa miniosa*, Fb., *Crocallis elingvaria*, L., and *Eupithecia dodoneata*, Gn.

13th JUNE, 1935.

The PRESIDENT in the Chair.

New Members:—Mr. E. S. Craske, of Maidenhead; Mr. F. D. Goodliffe, M.A., of Long Sutton; Mr. J. Jarrett, of New Malden; and Mr. A. H. Owen, of Croydon.

Mr. G. A. Brett exhibited larvae of *Orgyia antiqua*, L. with bifurcate tail tuft, from the E. Malling Research station, together with egg-parasites, *Telenomus dalmanni*, Grav. (*Scelionidae*) with egg-batches from which they had emerged.

Mr. S. Wakely exhibited larvae of *Brephos notha*, Hb. from Ongar, of *Strymon (Thecla) pruni*, L., and of *Pterophorus carphodactyla*, Hb.

Mr. A. F. O'Farrell exhibited larvae of *B. notha*, of *Monima (Taeniocampa) miniosa*, Fb., and of *Ectropis (Tephrosia) consonaria*, Hb.

Mr. Priske exhibited a tulip-leaf having its two edges grown together forming a hollow tube much resembling a *Sarracenia* pitcher plant structure.

Dr. E. A. Cockayne exhibited larva of *Ptychopoda humiliata*, Hufn. and of *Cerastis erythrocephala*, Fb. both of German origin.

Mr. M. Niblett exhibited the Trypetids, (1) *Xyphosia miliaria*, Schr., bred from flower heads of *Unicus palustris*, L. (emerged 2.vi.35). (2) *Rhagoletis alternata*, Fal. Larvae feed in the fruits of *Rosa* spp. These were bred from fruits of *Rosa hugonis* v. *platyacantha*. This species has been recorded from 29 varieties of Rose but not previously from *R. hugonis*. The larvae leave the fruits in the autumn, drop to earth, where they pupate, the flies emerging during June. Also the same species from fruits of *Rosa canina*, L.

Dr. C. G. M. de Worms exhibited larvae of the following species of Lepidoptera.—*Oeonistis quadra*, L. and *Pachnobia rubricosa*, Fb., from the New Forest; *Poecilopsis lapponaria*, Bdv., from Rannoch; *Poecilocampa populi*, L. and *Trichiura crataegi*, L., from Sussex; and *Dasychira fascelina*, L., from Forres.

16th JUNE, 1935.

FIELD MEETING—BROADWATER FOREST.

Leader.—G. V. BULL, B.A., M.B.

This meeting was spoilt by heavy thunderstorms in the early afternoon, but later the weather improved and a fair number of interesting captures were recorded, including *Palimpsestis* (*Polyplocia*) *fluctuosa*, Hb., *Ino statice*, L., *Hydriomena coerulea*, Fb. (*impluviata*, Hb.), *Perinephele lancealis*, Schiff. and *Somatochlora metallica*, Lind. (Odon.).

The Macrolepidoptera taken in addition to those reported last year were *Brenthis euphrosyne*, L., *B. selene*, Linn., *Polyommatus icarus*, Rott., *Pararge megera*, L. and *Coenonympha pamphilus*, L. *Dasychira pudibunda*, L., *Macrothylacia rubi*, L., *Hipocrita jacobaeae*, L. and *Drepana falcatoria*, L. *Panolis griseovariegata*, Goze. (*piniperda*, Panz.), *Heliaca tenebrata*, Scop., *Plusia gamma*, L. and *Phytometra viridaria*, Clrck. *Acidalia floslactata*, Haw. (*remutata*, Hb.), *Xanthorhoe montanata*, Schiff., *Euphyia corylata*, Thnbg., *Cabera pusaria*, L., *Pseudopanthera macularia*, L. and *Semiothisa liturata*, Clrck.

The Micros reported were *Tortrix ministrana*, L., *Capua favillaceana*, Hb., *Phoxopteryx upupana*, Tr., *Nemotois degeerella*, L. and *Pleurota bicostella*, Clrck.

The Odonata were *Calopteryx* (*Agrion*) *virgo*, L. and *Agrion* (*Coenagrion*) *puella*, L.

The Diptera recorded were:—*Tipula gigantea*, Schrank., *Volucella bombylans*, L., *V. pellucens*, L., *Rhingia rostrata*, L., *Sicus ferrugineus*, L., *Theriopectes tropicus*, Mg., *Haematopota pluvialis*, L., *Dioctria oëlandica*, L., *D. rufipes*, Deg. and *Neotamus cyanurus*, Lw.

Larvae of the following species were found:—*Notodonta dromedarius*, L., *Poecilocampa populi*, L., *Taeniocampa stabilis*, View., *Myelois neophanes*, Durr., *Evetria buoliana*, Schiff., and *Oxyptilia heterodactyla*, Haw.

27th JUNE, 1935.

The PRESIDENT in the Chair.

Dr. Williams exhibited the British species of the genus *Spilosoma* in illustration of his paper read subsequently.

Dr. Cockayne also exhibited series of the same species.

Mr. Coulson exhibited series of various small weevils and described his method of identification in this section of the Coleoptera. He also showed a collection of the various insects he captured during the Benfleet Field Meeting.

Mr. Howarth exhibited a *Sphinx ligustri*, L., with forewings shorter and squarer than normal and basal stripe on hindwings obscured; bred from a larva obtained at Box Hill; *Brenthis selene*, Schiff., ab. *nigricans*—*parvipunctata*, Obthr., taken in Surrey; and captured and bred specimens of *Hemaris fuciformis*, L., from Surrey, the latter well exhibiting the scales which disappear during the first flight.

Mr. Eagles exhibited the truffle-feeding beetle *Liodes cinnamomea*, Pz., from Epping Forest.

Mr. H. Moore read the following note on a Mason-bee's nest from Malta:—My special purpose is to exhibit the pupal skin of a species of *Anthrax*, a dipterous parasite, to show the frontal armour by means of which it bores through the crust of the cells of a mason-bee.

The exhibit is somewhat belated, but it came about this way. I was recently reading a paper on Diptera read to us by Mr. Andrews just over 25 years ago. Another quarter of a century before that, I was receiving things from all round the Mediterranean, wherever duty or courtesy required a Naval call. Fabre was merely a book name then, but thanks to Rennie and J. G. Wood, I became interested in Insect Architecture, and found a willing helper in a kinsman. In a box of stones sent to me with some bees' cells *in situ*, one stone got loose and the attached nest was broken in transit. Amongst the debris I found a fly which had emerged, and also its undamaged pupal skin. That chance reading reminded me of it, so I have resurrected it from the limbo of a store box, believing it may still be a novelty to some, even if thereby I divulge my own antiquity. To make matters clear, I cannot do better than borrow a few particulars from Fabre, already quoted by Mr. Andrews; not that the species is the same, for by the wildest stretch of imagination mine could not be likened to a snowflake. Fabre says "The fly lays its eggs on the ground, the newly hatched larva is a hair-like worm which enters the cell through some minute crack or crevice in the masonry. Then it completely changes its form . . . to a grub or maggot with a sucker-like mouth, and absorbs the contents of the bee larva without injury to its skin . . . when full fed it changes to a robust creature with a well developed head, armed with strong spines, and the body circled with rings of strong backward-pointing bristles. With its

armed head it breaks its way through the cement walls of the cell, the bristles preventing it from slipping back in the tunnel it makes for itself. Then comes the emergence of the perfect insect, making the fifth from the egg state"—egg, larva, prepupa, pupa, imago. As I had some doubts as to the maker of the nest, I thought I had better explore it further, thinking I might find a dead bee in one of the cells, as several seemed to be intact, and there was only one emergence hole. That was misleading; breaking through the side of a cell had evidently proved easier than boring through the crust. Inside one of the broken cells, I found a small metallic parasite like those so often bred from certain galls, and I suggest it may have been parasitic on the *Anthrax*. This would account for the two small exit holes on the crust, which are not large enough for either bee or fly.

The remaining cells were empty save one that contained fragments of what, I feel satisfied, are the remains of a ♂ *Anthophora* bee, which appears also to be the conclusion I came to in the long ago. The lining of the cells is easily removed and in several—between the lining and cell wall—were numbers of what I take to be puparia of one of the *Phoridae*, scavengers but not parasitic.

As in a fairly long membership I cannot remember a similar exhibit, I hope no further excuse for my present venture is required.

Dr. H. B. Williams then read his paper "Some Random Notes on the *Spilosominae*." (See Trans.)

30th JUNE, 1935.

FIELD MEETING—FOREST ROW.

Leader.—S. N. A. JACOBS.

With prospects of a fine day before them some twelve members and visitors foregathered at various times during the morning on this very beautiful corner of Ashdown Forest and settled down to work the woods, damp spots, and open spaces.

The vegetation still bore the scars of the disastrous frost of May, so that insects were delayed and *Limenitis camilla*, L. (*sibilla*, L.) was only just appearing, two specimens only being noted. Lepidoptera generally were scarce. *Scythris grandipennis*, Haw., was an insect new to our records of this district, although this was due probably again to the lateness of the season.

Ova of *Dicranura vinula*, L., were found on the dwarf Aspens, but larvae of *Pygaera pigra*, Hufn., were not forthcoming as in previous years.

Several specimens of the sweet scented Lesser Butterfly Orchis, *Habenaria bifolia*, R.Br., were found, and the Bog Asphodel, *Narthecium ossifragum*, Huds., and Sundew, *Drosera rotundifolia*, L. were also just beginning to bloom, and a patch of the Dodder, *Cuscuta epithymum*, Murr., on heather was found.

Lunch was taken in the open and working of the district continued until the party retired for tea in Forest Row, having spent an exceedingly enjoyable, if not an over productive day.

6th JULY, 1935.

FIELD MEETING—BOOKHAM COMMON.

Leader.—C. N. HAWKINS, F.R.E.S.

Perfect weather favoured this meeting ; plenty of sunshine, a few light clouds and a gentle breeze enabling the eleven members and two visitors, who attended, to pursue their own particular lines of observation and collecting under the best of conditions. Owing, probably, to the greater rainfall this year, the general appearance and state of the vegetation in the district were far superior to those noted last year, but the date was, perhaps, rather "between the seasons" for Lepidopterous larvae, though a fair number of species were recorded.

Arrangements were made for both whole- and half-day parties which met at the station after lunch. Tea was taken at Mrs. Holland's Farm on the Common, as usual, at about 5.30 p.m., after which several of the party left for home while others remained for a little further work in the evening. The district has been frequently visited by the Society and reported upon before so that it is unnecessary to give a full list of the species noted or taken. So far as Lepidoptera are concerned, however, mention may be made of the presence of comparatively large numbers of *Argynnis cydippe*, L. (*adippe*, L.) and *Limenitis camilla*, L. (*sibilla*, L.); of several colonies of larvae of *Nymphalis io*, L.; of the taking of both imagines and larvae of *Calothysanis amata*, L. (*amataria*, L.) and of the capture of larvae of *Notodonta trepida*, Esp. (one full-fed in penultimate stadium), *Pheosia dictaeoides*, Esp. (one), *Pterostoma*

palpina, L., *Drymonia chaonia*, Hb. (one), *Drepana binaria*, Hufn., *Ennomos erosaria*, Bkh. and numbers of larvae and cocoons of *Sarrothripus revayana*, Tr. (*undulans*, Hb.).

Mr. J. R. Collins reported the following additional species;—*Epinephele jurtina*, L., *Coenonympha pamphilus*, L., *Polyommatus icarus*, Rott., *Triphaena pronuba*, L., *Petilampa arcuosa*, Haw., *Crambus hortuellus*, Hb., *Scoparia dubitalis*, Hb., *S. ambigualis*, Tr., *Tortrix viridana*, L., and *Hylophila bicolorana*, Fues. (*quercana*, Schiff.), and larvae of *Dasychira pudibunda*, L.

Several members noted large assemblages of a Hymenopteron flying up and down, and settling upon, the trunks of certain oaks, without any clue being obtained as to the reason for this curious behaviour. Specimens of the Hymenopteron were taken for identification. (Cf. Rep. Horsley Field Meeting 7.vii.28, and Chalfont 27.vi.30.)

Mr. A. W. Attwood reported the capture of the following Micro-lepidoptera—*Tortrix loeflingiana*, L., *Argyrotoxa bergmanniana*, L., *Pandemis heparana*, Schiff., *Cnephasia nubilana*, Hb., *Batodes angustiorana*, Haw., *Ancylis achatana*, Fb., *Recurvaria leucatella*, Clrek., *Cerostoma xylostella*, L., *Scoparia dubitalis*, Hb., *Chirocompa (Oecophora) lunaris*, Haw., *Gracillaria alchimiella*, Scop.; and larvae of the following species of Macro-lepidoptera. *Dicranura (Cenura) vinula*, L., *Biston strataria*, Hufn., *Orgyia antiqua*, L., *Harmodia (Dianthoecia) carpophaga*, Bork., *H. capsicola*, Hb., and *Eupithecia venosata*, Fb.

Messrs F. J. Coulson and T. R. Eagles added the following species of Coleoptera to those which have already been recorded from this locality.—*Stomis punicatus*, Pz. *Dromius quadrisignatus*, Dj., beating oak boughs. *Haliphus lineaticollis*, Mm., common in pond. *Graptodytes lineatus*, F., common in pond. *Gyrophæna affinis*, Sg., abundant in fungi. *Agrilus angustulus*, Ill., common on oaks. *Cantharis bicolor*, Hb., not common. *C. fulvicollis*, F. var. *flavilabris*, Fn. *Malthinus flaveolus*, Pk., common. *M. fasciatus*, Ol., common. *Malthodes minimus*, L., abundant. *Phytodecta viminalis*, L., on willow, fairly common. *Crepidodera transversa*, Mm., amongst rush. *Anobium fulvicorne*, St., beating oak; frequent. *Chalcoides aurata*, Mm., (with blue var.) commonly. *C. aurea*, Geoff., beating aspen. *Cryptocephalus labiatus*, L., commonly on oak. *Leiopus nebulosa*, L., frequent on oak. *Epuraea deleta*, St. *Rhynchites tomentosus*, Gy., *Coeliodes dryados*, Gmel. *Magdalis cerasi*, L. *Orchestes avellanae*, Don. *Dorytomus melanophthalma*, Pk. *D. taeniatus*, F., abundant on

sallow. *Tanyssphyrus lemnae*, F., on aquatic vegetation. *Anthonomus rubi*, Hb., common. *Abdera biflexuosa*, Ct. *Anaspis humeralis*, F., abundantly. *A. subtestacea*, S., scarce. *Lagria hirta*, L.

11th JULY, 1935.

The PRESIDENT in the Chair.

Mr. Coulson exhibited series of the various races and forms of *Diacrisia* (*Spilosoma*) *lutea*, L. (*lubricipeda*, Esp.) in further illustration of Dr. Williams paper of the previous meeting. He dealt also with the history of f. *eboraci*, Tugwl. and f. *fasciata*, Tugwl.

Dr. Blair exhibited an exotic Tortoise beetle from Brazil, found in a fruiterer's shop; *Mesomphalia sextillata*, Boh.; and also the aphid gall of *Pamphigus marsupialis*, Couchet, on leaves of poplar, *Populus nigra*, L.

Dr. Williams exhibited living larvae of *Pararge aegeria*, L., from ova obtained in West Sussex.

Mr. Eagles exhibited a plant in flower of *Astrantia major*, L., the food-plant of *Depressaria astrantiae*, Hein., recently announced in the "Entomologist's Record," May 1935, as occurring in the British Isles: also larvae of *Cosymbia punctaria*, L., from Bookham.

Mr. Ennis exhibited the musk beetle *Aromia moschata*, L., from Shepperton.

Mr. M. Niblett exhibited the Trypetidae (1) *Orellia ruficauda*, Fab., bred from flower-heads of *Cnicus pratensis*, Willd. (Meadow Plume Thistle), an unrecorded host-plant; emerged June 1935. (2) *Acidia cognata*, Wied., bred from leaf mines of *Tussilago farfara*, L. (Colts-foot); emerged June 1935, and (3) *Urophora stylata*, Fab., bred from a gall in a flower-head of *Cnicus arvensis*, L.; emerged June 1935.

Mr. Wakely exhibited a bred series of *Cepphis* (*Epione*) *adrenaria*, Hb., from the New Forest.

The President exhibited an example of the cricket *Gryllus campestris*, L., from the Isle of Wight.

Mr. Denvil exhibited larvae of *Pterostoma palpina*, L. of *Drymonia chaonia*, Hb., of *Notodonta trepida*, Esp., and a female of *Cochlidion limacodes*, Hufn. (*testudo*, Schiff.) from Bookham.

Dr. Bull reported attacks on Lepidoptera by various predators and insects of other Orders, e.g., (1) An *Agrotis exclamationis*, L. by a *Carabus* sp. (Col.), and (2) A *Caradrina* sp. by a red centipede.

He also communicated the following notes:—

A NIGHT IN WICKEN FEN, 25TH JUNE.—The sugar patches were crowded with *Agrotis exclamationis*, L. and *A. segetum*, Schiff., so that it was very difficult to pick out the better insects, such as *Aplecta advena*, Fb., *Hadena adusta*, Esp. The most plentiful insect at the light sheet was *Phragmatocia castaneae*, Hb. (*arundinis*, Hb.), and a fair number of *Meliana flammea*, Curt. and *Senta maritima*, Tausch. also appeared, with *Acidalia immutata*, L., *Herminia cribralis*, Hb., and *Leucania impudens*, Hb. One *L. obsoleta*, Hb., was taken and a few *Bankia argentula*, Hb. and *Ustrotia uncula*, Clrck. were taken dusking.

NOTES ON AVIEMORE IN LATE APRIL.—I spent the last week of April at Aviemore with Mr. Mellows. The weather was cool with a fair amount of sunshine. *Taeniocampa gothica*, L., *T. incerta*, Hufn., and *Nothopteryx* (*Lobophora*) *carpinata* were abundant and in great variety, a fair number of the form *gothicina*, H.-S., being secured. *Brephos parthenias*, L., was flying in fresh condition; *Polyplocia flavicornis*, L., was found at rest, and *Calostigia multistrigaria*, Haw., was taken at Sallow blossom. Only single specimens of *Endromis versicolor*, L., were seen before 26th and 27th April, when about 30 were netted or taken at rest. Three ♀ ♀ were found ovipositing by Mr. Mellows on the night of the 26th and I took a freshly emerged ♀ on the morning of 28th April. We took her up the hill in the afternoon, but as the day was dull and cool she was sluggish and only 5 ♂ ♂ came up. The use of an electric torch seemed to excite her, resulting in the speedy appearance of suitors on two occasions. A fresh *Asteroscopus nubeculosa*, Esp., was taken on the wing on 27th April. *Lampropteryx suffumata*, Schiff., was first seen on 26th April, but was scarce and none of the dark form was noted.

Larvae of *Aplecta tincta*, Brahm., were abundant on the birches and a few *A. occulta*, L., were found on bog myrtle. On a dull afternoon at Culbin Sands a few larvae of *Arctia caia*, L., and *Dasychira fascelina*, L., and one of *Lasiocampa quercus*, L. f. *callunae*, Palm. were captured.

It was reported that *Acontia luctuosa*, Esp., and *Earias chlorana*, L., had been taken near Norwood Junction.

14th JULY, 1935.

FIELD MEETING—SOUTH BENFLEET (THAMES MARSHES).

Leader.—R. W. ATTWOOD.

Seven Members attended and a very pleasant day was spent in spite of the intense heat. The recent drought had dried many of the

dykes, and although the insects were not so numerous as usual, the drought had the effect of concentrating the water-loving insects in the deeper dykes which still contained water. The party were chiefly lepidopterists but Mr. O'Farrel worked for the Dragon-Flies and Diptera. Unfortunately no Coleopterist was present.

The route for the morning was along the disused Railway Siding on the mainland, to the Sea Wall and Marshes. *Pamphila (Adopoea) lineola*, Och. was abundant hereabouts and members who required a series were soon satisfied. The larvae of *Euchloris smaragdaria*, Fb. were found by searching the Sea-Wormwood growing along the Sea Wall. They were very small but in fair numbers. The larvae of the local Plume Moth, *Agdistis bennettii*, Curt. were quite common on the Sea Lavender and they were easily obtained by shaking the plant over a net, very different from *E. smaragdaria* which clings tightly to the foodplant, and is best obtained by searching.

After lunch the party proceeded to the higher ground, working the dykes on the way, and obtaining larvae and pupae of *Nonagria geminipuncta*, Hatch. in the reed stems. It was along these dykes that the Dragon-Flies *Lestes dryas*, Kirby, *Sympetrum sanguinea*, Müll., *Anax imperator*, Leach, and *Ischnura elegans*, Lind. were obtained. *Lestes dryas* was quite common. A female of *Ischnura elegans* was taken, in which the usual blue markings were a deep orange shade. A male and female of the Dipteron, *Stratiomys furcata*, Fb. were also taken here.

On the hill *Melanargia galathea*, L. were abundant and in splendid condition, *Hipparchia (Aphantopus) hyperantus*, L. was common but *Epinephele tithonus*, L. was just emerging and only two were seen.

It was curious that the local Grasshopper, *Metrioptera roeselii*, Hagb., which was so common at the previous meeting was very scarce this year and only two were seen, both immature; possibly the severe frost in May reduced their numbers.

A specimen of *Acontia (Eustrotia) luctuosa*, Esp. was captured and an interesting butterfly for the district, *Limenitis camilla*, L. (*sibilla*, L.) was seen flying alongside the wood on the crest of the hill.

Other larvae found included *Palimpsestis* or, Fb. and *Pygaera curtula*, L.

Tea was taken at the Hoy Inn.

25th JULY, 1935.

The PRESIDENT in the Chair.

Mr. S. Wakely exhibited specimens of *Telphusa alburnella*, Dup. taken by Mr. A. Smith at Strensall, near York, and determined by Mr. H. Stringer, British Museum. This species is a new addition to the British List of Lepidoptera.

Dr. Bull exhibited a very varied series of *Taeniocampa incerta*, Hufn. taken by him at Aviemore in April of this year.

Mr. C. N. Hawkins exhibited a short series of *Calocalpe* (*Eucosmia*) *undulata*, L. bred from ova laid by a ♀ taken at Byfleet on 30th June, 1934. The ova were laid from the 4th to 8th July, 1934, and hatched from 8th to 11th July. They were laid in a closed chip-box and remained there until they hatched, so were, more or less, kept in the dark, which may possibly have prevented the normal colour changes, though this seems unlikely. However this may be, these ova were coloured pale creamy white when laid, with a furrow down the upper side, and they showed no colour change whatever prior to hatching, whereas Tonge in his paper "Ova of British Lepidoptera" Part III. ("Trans. S.L. Ent. and Nat. Hist. Soc." 1932-33, p. 16) describes the ova from specimens sent to him by a correspondent as "pinkish brown." It may be that the ova of this, and other species, are more variable in colour than is generally realized.

The series of imagines shown emerged from the 4th to the 10th June, 1935.

Mr. T. R. Eagles exhibited (1) a series of *Dorcatoma serra*, Mots. (Col.), with specimens of the decayed wood from the trunk of an oak, in which larvae were found. Also examples of Hymenoptera from the same wood, probably parasites on the coleopterous larvae. (2) A larva of *Boarmia punctinalis*, Scop. (*consortaria*, Hb.) beaten out during the Field Meeting at Bookham on 6th July. All but one were parasitized. (3) A specimen of the Heteropteron *Reduvius personatus*, L., a predator on other insects. It was taken in a house at Enfield.

Mr. M. Niblett exhibited the following *Trypetidae*:—*Paroxyma plantaginis*, Hal., bred from flower-heads of *Aster tripolium*, L. Emerged 3.vii.35. *Tephritis vespertina*, Lw., bred from flower-heads of *Hypochoeris radicata*, L. 18.vii.35. *Trypeta zoë*, Mg., bred from mined leaves of *Chrysanthemum maximum*. Bred 18.vii.35.

The President exhibited leaves of plum on the under surface of

which were numerous aphids, among which he had observed the larva of a Syrphid browsing.

Mr. Coulson exhibited a further considerable number of insects he had taken at Field Meetings during the year.

Mr. Attwood exhibited larvae and pupae of *Aqdistis bennetii*, Curt., obtained from the Thames banks.

Miss E. Brooke exhibited the small "porcelain" crab, and the "dog" barnacle, from the Irish coast.

Preliminary Reports of the Bookham and Benfleet Field Meetings were presented by the respective leaders, Mr. C. N. Hawkins and Mr. Attwood.

28th JULY, 1935.

FIELD MEETING.—BOX HILL (arranged for Leith Hill).

Leader.—S. Wakely.

Owing to a 'bus strike affecting the Coldharbour service, the small party which went to Dorking North decided to try Boxhill. The weather was very fine, and the followingspecies were taken: *Limenitis camilla*, L. (*sibilla*, L.) (several), *Polygonia c-album*, L., *Vanessa atalanta*, L. (larvae), *V. cardui*, L. (one larva on thistle). *Aglais urticae*, L. (larvae in great abundance on nettles), *Satyrus semele*, L., *Pararge aegeria*, L., *Urbicola* (*Pamphila*) *comma*, L., *Demas* (*Calocasia*) *coryli*, L. (larvae), *Pyrausta nigrata*, Scop., *Catoptria* (*Lathronympha*) *hypericana*, Hb. (larvae swarming in seed-heads of *Hypericum perforatum*, L.) *Argynnis aglaia*, L. and *Drepana cultraria*, Fb. were also observed flying. Mr. H. Moore reported taking *Leptophyes punctatissima*, Bosc. (common) one of the *Locustidae*; *Halictus cylindricus*, Fb. (*calceatus*, Scop.), one of the bees; also two flies—*Volucella inanis*, L. and *Myiatropa florea*, L.

8th AUGUST, 1935.

The PRESIDENT in the Chair.

Mr. F. J. Coulson exhibited two examples of *Attagenus trifasciatus*, Fb. and two males and four females of *A. piceus*, Ol. var. *megatoma*, Fb. taken in the City, the latter freely, by Mr. Wakely in Finsbury, E.C., both rare and local species (Col.). Also three examples of

Smicronyx jungermanniae, Reich, and two of *S. reichi*, Gyll. from an old collection (Col.).

Mr. C. N. Hawkins exhibited.—1. A short series of *Philereme* (*Scotosia*) *transversata*, Hufn. (*rhamnata*, Schiff.) bred from larvae taken at the Box Hill Field Meeting on 11.v.1935. Six males and six females were shown and attention was drawn to 2 males with the cross lines absent on the outer-marginal areas and at the shoulders giving the insects a very "plain" and banded appearance. Also to one very dark and one very brown female, and, in both sexes to the absence or varying development of the cream coloured subterminal line, etc.

2. Two preserved female larvae of the 2nd brood of *Orgyia* (*Notolophus*) *gonostigma*, F. bred ab. ovo from moths resulting from larvae taken at the Brentwood Field Meeting on 1.vi.35. In one larva all the smaller dorsal and the lateral tufts consisted of white hairs, as usual, but in the other larva all these hairs are bright golden. There was a golden haired female larva amongst those of the parents so it is doubtless an inherited character, but I can give no figures as most of the ova were given away. Amongst my larvae the golden haired ones were in the proportion of one to five amongst females. I did not notice it in the males but it may have occurred as many had pupated before I made the count.

3. Full-fed 2nd brood larvae of *Ptychopoda aversata*, L., bred from ova laid 3rd-4th July, 1935 by a female taken by Mr. P. Bainbrigge Fletcher at Wimbledon.

4. Larvae of *Euphyia cuculata*, Hufn. found on *Galium mollugo* on 3.viii.35 in Surrey.

Dr. E. A. Cockayne exhibited a preserved larva of *Calamia lutos*, Hb. and read the following note:—

"Tutt quotes Gardner as saying that the presence of the larva of *Calamia lutos* may be readily detected, from the bleached appearance of the plants which have been attacked, and Barrett also says that it is betrayed by the blanching of the reed. Other authorities, including a German one, say that it makes the whole reed turn yellow. I have no doubt that this is true in some cases, for in early August I found a very large yellow reed near Barton Staithe with the bottom of the stem full of frass too large for any other larva, but I think it is exceptional. Mr. H. Worsley Wood and I looked for larvae at Wicken, where the moths had been fairly plentiful the previous autumn, but we failed to find a single yellow reed.

"This year Mr. A. H. Sperring told me he had found a place

where small reeds were growing rather sparsely along a bank and in a dry ditch below, and that he had seen the moths drying their wings there in large numbers last September. The place appeared to be a good one even for digging blindly. I joined him on 19th July and we examined all the reeds without finding a single yellow or bleached one. Three or four had a slight tinge of yellow, but there was no sign of frass at their bases. The bank, which we had thought the likeliest part, was clay, too dry and hard to dig up, so we dug at the side and bottom of the ditch and found five main roots full of fresh frass, but they had broken at the weak spot made by the larva, and in each case it must have been in the part left behind. It was hopeless to try to find the other end in mud more than a foot deep. However after six hours work a larva, about half the size of a full-grown one, came to the surface of the mud, having no doubt been pulled part of the way out of a main root, which we had broken. I think that where the reeds are very large the larvae may feed at the base where a shoot springs from the main root and so turn a whole reed yellow, but where the reeds are small there is no room inside for so large a larva to feed, and only the main roots are attacked. These give off rootlets at short intervals and even when they are partly destroyed enough water is absorbed to keep the reeds green. I agree with Gardner that the larva is very difficult to obtain."

Mr. Coote exhibited the ova of *Callimorpha quadripunctaria*, Pod. (*hera*, L.) from Devon.

17th AUGUST, 1935.

FIELD MEETING—EYNSFORD.

Leader.—Dr. K. G. BLAIR.

The route followed was very much as last year, and though many of the more interesting captures were repeated, little was added to the list. Special attention was paid to the larvae of *Leioptilus carphodactyla*, Hb. and it was ascertained that these fed for at least a good part of their lives in the flower heads of *Inula conyza*, D.C., and did not merely enter them for pupation. The larvae of *Lophopteryx cuculla*, Esp. were scarcer and smaller than last year in spite of the date being a week later. With *Anaitis plagiata*, L. the closely similar *A. efformata*, Guen. was taken in fair numbers.

Mr. Jacobs supplied the following list of Pyrales and Microlepidoptera :—*Phlyctaenia prunalis*, Schiff., *Mesographe forficalis*, L., *Crambus geniculeus*, Haw., *Pyrausta purpuralis*, L., *P. nigrata*, Scop., *P. aurata*, Scop., *Argyroplote betuleana*, Haw., *Lathronympha* (*Catoptria*) *hypericana*, Hb., *Pandemis corylana*, F., *Eucosma nigromaculana*, Haw., *Laspeyresia compositella*, Fb., *Borkhausenia fusescens*, Haw., *Pancalia leuwenhoekella*, L., *Stomopteryx taeniolella*, Zell., *Carcina quercana*, Fb.

The morning party consisted of 8 only, but Mr. Coulson brought the afternoon contingent to the testing range, swelling our numbers to the more respectable total of 9. Though rain threatened in the morning it was not enough to interfere with collecting.

22nd AUGUST, 1935.

The PRESIDENT in the Chair.

Dr. K. G. Blair exhibited a living nymph of *Centrobis cornutus*, L. (*Membracidae*) comparing it with the mature insect; and leaves of Salad Burnet (*Poterium sanguisorba*, L.) galled by the mite *Eriophyes sanguisorbae*, Nal.; both these had been collected on the occasion of the Eynsford Field Meeting.

He also showed a group photograph taken at the Congress of British Entomology at Oxford in July.

Mr. A. Bliss exhibited grey-brown forms of *Hyloicus pinastri*, L. from Dorset, and larvae of *Mesoleuca albicillata*, L.

Dr. E. A. Cockayne exhibited an unusual form of the larva of *Cucullia asteris*, Schiff. The full grown larva was sent by Mr. A. J. Wightman from Sussex. The ground colour of both head and body is deep rose, matching with Ridgway's Corinthian red; the former is freckled with black while on the latter the dorsal stripe is deeper yellow and rather narrower than usual and is bordered by a very narrow but distinct black line on each side; the subdorsal line is pale yellow and very narrow, being about half the usual width, and is edged with black; the spiracular stripe is narrower than usual and of the same deep yellow as the dorsal one and is edged above with black; above this is a narrow pale yellow line bordered above by a very narrow black one, and above this again, running through the ground colour, is a very thin black line, which is situated much nearer to the spiracular stripe than usual, leaving a stripe of ground colour of about half the normal width. The ventral surface is

almost wholly of Corinthian red. On the last two somites the dorsal and spiracular stripes only are present, the rest being Corinthian red. The redness of the larva was very striking during life and is quite well preserved in the blown larva.

Mr. Jacobs exhibited *Phthorimaea operculella*, Zell., a proscribed pest of imported potatoes, from a sample from Valencia district. The insect so far has not been able to survive our winter, but the Ministry of Agriculture takes no chances.

Mr. Hawkins exhibited two bred examples of *Sterrhia* (*Ptychopoda*) *humiliata*, Hufn. of German origin; and *Hadena nana*, Hufn. (*dentina*, Esp.) bred from Gloucestershire ova.

Mr. Eagles exhibited a brown form of the larva of *Pheosia tremula*, Och. (*dictaea*, L.) from Bayford, Herts, and a flint fossil of a sea-urchin, Littlehampton, Sussex.

Mr. Bunnnett exhibited the Homopteron *Gargara genistae*, Fab. from broom at Mytchett; and the Coleopteron *Cassida viridis*, L. (*equestris*, Fab.) from the Basingstoke Canal.

Mr. Pinhey exhibited aberrations of *Argynnis adippe*, L. from the New Forest; two aberrations of *Hipocrita jacobaeae*, L. one yellow and the other smoky, from Broughton, Hunts; a white aberration of *Adopoea flava*, Brun. (*thauamas*, Hufn.) from Brockenhurst; and other species.

8th SEPTEMBER 1935.

FIELD MEETING—BYFLEET.

Leader.—F. J. COULSON.

The day throughout was warm and at times the sun was well in evidence. Fifteen members and friends attended the meeting and some interesting observations were made and many captures were effected. The morning party of five worked the area by the canal to the east of the bridge, beyond the houses. Most of their attention was devoted to beating oak, birch and aspen and a good bag of lepidopterous larvae, beetles and bugs was made. In the afternoon the early party proceeded to the area on the west side of the bridge where other members of the party had already been working.

The species of Lepidoptera observed in the imaginal state were *Gonopteryx rhamni*, L., *Lygris* (*Eustroma*) *testata*, L., *Sterrhia* (*Ptychopoda*) *aversata*, L., *Rivula sericealis*, Scop., *Eucosma solandriana*, L.

and *Argyresthia goedartella*, L. One specimen of *Synanthedon* (*Sesia*) *vespiformis*, Lasp. was found in a spider's web.

The lepidopterous larvae observed, or secured, were *Smerinthus populi*, L., *Phalera bucephala*, L., *Dasychira pudibunda*, L., *Notodonta ziczac*, L., *Lophopteryx camelina*, L., *Leucoma* (*Porthesia*) *chrysorrhoea*, Esp. (*similis*, Fues.), *Drepana binaria*, Hufn. and *D. falcataria*, L., *Comibaena pustulata*, Hufn., *Cosymbia punctaria*, L., *C. pendularia*, Clrek. and *C. porata*, L., *Euclidia mi*, Clrek., *Halias prasinana*, L. and *Cochlidion* (*Apoda*) *limacodes*, Hufn.

Coleoptera and Heteroptera were especially numerous on oak, aspen, birch and sallow. Sweeping low plants was however unproductive. The species taken throughout the day were *Dromius quadrimaculatus*, L., *Agonum assimile*, Payk., *Olibrus aeneus*, Fb., *Stilbus testaceus*, Pz., *Coccinella distincta*, Fald., *Simplocaria semistriata*, F., *Cryptocephalus parvulus*, Müll., *Lochmaea capraeae*, L., *Zeugophora subspinosus*, Fb., *Melasoma populi*, L., *Rhinoneus castor*, F., *Balaninus rubidum*, Gyll., *Sitones hispidulus*, Fb., *Salpingus ater*, Pk. and *Rhinosimus planirostris*, Fb. The species of Heteroptera secured were *Troilus luridus*, Fb., *Pentatoma rufipes*, L., *Elasmotethus griseus*, L., *Ischnorhynchus resedae*, Pz., *Corizus maculatus*, Fieb., *Scolopostethus decoratus*, Hah., *Syromastes marginatus*, L., *Nabis aptera*, Fb. and *N. lativentris*, Boh., *Calocoris infusus*, H.-S., *Triphleps nigra*, Wolff., *Pilophorus perplexus*, Scott., were numerous on the leaves of oak in company with the ant *Formica rufa*, L.

Gargara genistae, Fb., a species of Homoptera and a cockroach, *Ectobius lapponica*, L., were also taken.

12th SEPTEMBER, 1935.

The PRESIDENT in the Chair.

Mr. S. Wakely exhibited larvae of the following species:—*Cerura furcula*, L.; *Dasychira pudibunda*, L.; *Hadena* (*Polia*) *adusta*, Esp.; *Caradrina clavipalpis*, Scop. (*quadripunctata*, Fb.); *Biston betularia*, L.; *Abraaxas sylvata*, Scop.; *Peronea boscana*, Fb. and *Coleophora limosipennella*, Dup; also a piece of cork into which a score of larvae of *Brephos notha*, Hb. had burrowed for pupation.

He also exhibited imagines of the following Lepidoptera, bred from larvae taken in the Isle of Wight last August:—*Stauropus fagi*, L.; *Notodonta ziczic*, L.; *Earias chlorana*, L.; *Biston betularia*,

L.; *Calocalpe undulata*, L.; *Mysticoptera sexalata*, Retz.; *Hydriomena ruberata*, Frr., and *Perizoma alchemillata*, L. Two specimens of *Acidalia* (*Leptomeris*) *immorata*, L. from Sussex were also shown, both bred from ova.

Mr. T. R. Eagles exhibited the following larvae:—*Lomaspilis marginata*, L.; *Drepana binaria*, Hufn.; and *Cosymbia* (*Ephyra*) *punctaria*, L., from Byfleet. *Pygaera curtula*, L., and *Pheosia tremula*, Clrk., from Bayford, Herts. *Hemithea aestivaria*, Hb. (*strigata*, Mull.), and *Ourapteryx sambucaria*, L. from Enfield. Also parasitized ova of *Macrothylacia rubi*, L. from Byfleet.

Mr. F. J. Coulson exhibited the following Coleoptera and Rhynchota:—

Coleoptera:—(1) Series of *Eurynebria complanata*, L. from Taunton, Devon, 22nd August, 1935. (2) Red forms of *Cafius xantholoma*, Gr. from Woolacombe, Devon, 27th August, 1935.

Rhynchota:—(3) Series of *Metacanthus elegans*, Curt. from *Ononis spinosa*, L., Taunton, 22nd August, 1935. (4) Three species from garden, Merton Park: (a) *Plagiognathus albipennis*, Fall. from "old man," July, 1935; (b) *Dicyphus pallidicornis*, Fieb. from foxglove, August, 1935; (c) *Eupteryx abrotani*, Dgl. from "old man," July, 1935.

Mr. L. H. Tompkins exhibited *Nymphalis polychloros*, L.; *Rumicia* (*Heodes*) *phlaeas*, L. ab. *schmidtii*, Gerh. and larvae of *Caradrina clavipalpis*, Scop. (*quadripunctata*, Fb.).

Mr. E. C. S. Pinbey exhibited a sprig apparently bearing flowers of both ling and heath, the cause or actual nature of the occurrence being so far unexplained.

Mr. R. W. Attwood exhibited larvae of *Cochlidion* (*Apoda*) *limacodes*, Hufn.; *Drepana falcataria*, L.; and *Comibaena* (*Euchloris*) *pustulata*, Hufn. from Byfleet, taken at the Field Meeting in September. And *Euchloris smaragdaria*, Fb., from Benfleet, taken at the Field Meeting in July.

Mr. Eagles reported that numerous larvae of *Polygonia c-album*, L., had been found on a hop plant in a garden at Enfield, less than 10 miles from Charing Cross. He subsequently reported, with regard to a sample of infected flour, that Miss Kirby suspects that the mites therein are *Tyroglyphus farinae*.

26th SEPTEMBER, 1935.

The PRESIDENT in the Chair.

Mr. Wakely exhibited an extremely fine melanic example of *Chiasmia clathrata*, L. (the ab. *nocturnata* of Fuchs.) from the I. of Wight.

Mr. M. Niblett exhibited *Orellia falcata*, Scop. (*Trypetidae*) bred from larvae feeding in roots of *Tragopogon pratensis*, L. Flies emerged 3rd week May to 3rd week June.

Mr. T. R. Eagles exhibited eleven species of Coleoptera taken in a brief search of a fallen beech trunk in Epping Forest in May 1935 including *Pediacus dermestoides*, Fb., (cf. "Ent. Mo. Mag.," May, 1935.)

Mr. H. W. Andrews also exhibited the scarce Dipteron *Trypeta falcata*, Scop. from the Thames Marshes, Abbey Wood.

Mr. Wakely read a short paper on species of British Plume Moths he had recently met with. (See Trans.)

Mr. Downes read a short paper on a special phase in the Biological History of the Locust, *Pachytylus (Locusta) migratorius*, L.

10th OCTOBER, 1935.

The PRESIDENT in the Chair.

Mr. E. J. Bunnett exhibited *Cassida vittata*, Vill., found near Chiselhurst Common.

Dr. Cockayne exhibited a specimen of the genus *Zygaena* and read the following note:—

In August Professor Heslop Harrison sent a *Zygaena* for me to identify without giving me any information about its origin. It was a *Z. achilleae*, Esp. with a smooth abdomen and pale forewings like many continental ones. In reply to my question about locality he wrote, "I have just returned from Raasay, where I found a single cocoon with a dead pupa, which I extracted. The spots looked so suspicious that I made a further journey to the point where I found it and succeeded in taking two worn moths, one of which I sent to you. At home I confirmed my belief that it was *Z. achilleae*, but wished to have your opinion. The locality was a heathery one with some thyme and lotus. Later, at a place ten miles away in the north of the island, I found an empty cocoon attached to heather."

Also exhibited were two from Argyleshire, subsp. *caledonica*, Reiss.

and three from Thuringia. The Raasay specimen is more like those from Thuringia.

A fine series of *Bryophila* (*Metachrostis*) *impar*, Warr. from Cambridge was shown by Mr. C. N. Hawkins, who stated that they had been sent by Mr. Worsley Wood for the Society's Cabinet. Mr. Hawkins also exhibited *Sarrothripus revayana*, Tr. and *Eupithecia pimpinellata*, Hb. (*denotata*, Gn.).

Mr. E. Niblett exhibited two gall-making species of Diptera—

TRYPETIDAE.—*Myopites longirostris*, Lw. (*frauenfeldi*, Sch.) bred from flower-heads of *Inula crithmoides*, L. Emerged, 20.viii.35.

ANTHOMYIIDAE.—*Chortophila* (*Egeria*) *cinerea*, Fall., bred from flower-heads of *Senecio jacobaea*, L. Emerged 28.vi.35.

Mr. T. R. Eagles exhibited portions of the fungus *Daldinia* (*Sphaeria*) *concentrica*, Ces. and the Coleoptera *Diphyllus lunatus*, Fb. and *Ditoma crenata*, Fb. reared from it. (See "E.M.M." LXXI. 64, 65)

Mr. S. Wakely exhibited series of *Harmodia* (*Dianthoecia*) *nana*, Rott. (*consersa*, Esp.), *H. bicurvis*, Hufn. (*capsincola*, Hb.), *H. lepida*, Esp. (*carpophaga*, Bork.) and *Eupithecia venosata*, Fb., bred from larvae feeding in the seed-heads of *Silene inflata*, Sm. and *Lychnis alba*, Mill. and taken at the Chalfont Road Field Meeting on 30th June, 1934. It is interesting to record that *Harmodia nana* emerged in the largest numbers. The variation of *H. lepida* (*carpophaga*) is very noticeable, some of the pale specimens being rather striking.

Also three bred specimens of *Agrophila* (*Eustrotia*) *trabealis*, Scop. (*sulphuralis*, L.) from ova laid by a female taken by Dr. King in the Breck District; and a very fine specimen of *Acontia* (*Eustrotia*) *luctuosa*, Esp. taken at light at Upper Norwood, with the white spots on hindwings appearing about half the size of those in a normal specimen.

Mr. H. Moore exhibited *Thesprotia graminis*, Scudder, the slenderest grass mantis found in Florida, described by Blatchley as being common throughout the winter at Dunedin in "wire grass" and other undergrowth in open pine woods, and frequently taken when sweeping for beetles. Also *Myrmeleon roseipennis*, Burm., an ornamented species of Ant-lion from Wyandotte, Indiana.

Mr. Jacobs exhibited the fungus *Daldinia concentrica*, containing larvae of *Myelois neophanes*, Durr., from Broadwater Forest.

Dr. Bull exhibited a 2nd brood of *Diacrisia lutea*, L. (*lubricipeda*, Esp.), 1930, and the Homopteron *Ledra aurita*, L.; both species from Kent.

Mr. Pinhey exhibited a "praying mantis" captured a few months before flying in a garage in Lyndhurst, and an example of *Prionus coriarius*, L. (Col.) which flew to light, at Lyndhurst, 5.viii.35; also a larva of the same taken in roots of a fallen fir-tree, at Lyndhurst, 19.ix.35.

Mr. E. J. Bedford exhibited the photograph of a *Catocala fraxini*, L., taken in Sussex, on 15th Sept.

Mr. Bunnett then exhibited a large number of lantern slides illustrating micro objects of natural history.

24th OCTOBER, 1935.

THE ANNUAL EXHIBITION AND CONVERSAZIONE.

The PRESIDENT, Mr. E. E. SYMS, F.R.E.S., in the Chair.

A large number of members and their friends and numerous visitors were present as usual at this annual reunion. The exhibits were not so varied as customary; most of the exhibits were of Lepidoptera, many of exceptional interest.

Mr. J. C. B. Craske exhibited a large number of aberrations of British Lepidoptera including *Enodia hyperantus*, L. with lanceolate ocelli; a female *Brenthis euphrosyne*, L. with radiate hindwings; a ♀ *Pontia daplidice*, L. taken on the Brighton Downs on 1st Sept. about 11.45 a.m., with a strong southerly wind blowing; a ♂ *Euchloë cardamines*, L. having light lemon apex to the forewings instead of the normal orange; an *Aricia agestis*, Schiff. (*medon*, Esp.) of the ab. *allous*, Hb. form from Bucks in 1934; a ♂ *Rumicia* (*Heodes*) *phlaeas*, L. with band on hindwing obsolete; and another, a ♀ with hindwings *radiata*, Tutt, form; a silver ♀ form of *Angiades* (*Ochlodes*) *venata*, Brem. (*sylvanus*, Esp.) from Barton Hills, Beds.; and others.

Miss Winifred M. A. Brookes exhibited a collection of her drawings of Plant and Animal Life on the Seashore, and of natural objects seen under a hand-glass.

Dr. E. A. Cockayne exhibited *Ematurga atomaria*, L. ♂ cream-coloured with the lines chocolate brown and with no speckling or terminal markings, Sussex 1935; and *Lomaspilis marginata*, L. ab. *pollutaria*, Hb., Surrey, 1935.

Mr. Coote exhibited larvae and pupae of *Pterophorus* (*Leioptilus*) *carphodactyla*, Hb. taken at the Field Meeting at Eynsford, Kent, 17th August. Imagines emerged 30.viii.35 to 15.ix.35.

Mr. Clifford Craufurd, on behalf of Mr. N. T. Easton, exhibited a number of aberrations of British Rhopalocera including *Polygonia c-album*, L. deep chocolate form. Bred from a larva from the Oxford district, amongst a number of typical specimens. 19.ix.33.

Aglais urticae, L.—(1) A bred female with ground colour straw and pale dirty brick; blue lunules on forewings having bleached appearance and those on hindwings pale mauve; the two spots between veins 2 and 4 rectangular and smudgy. Bred from a larva at Littlebourne, Kent. 18.x.24.

(2) A bred female var. *polaris*, Stdgr. from a larva at Littlebourne, Kent. 26.viii.25.

(3) Female var. *ichnusa-polaris*. This specimen has characteristics of both these well-known forms of *V. urticae*. The twin spots between veins 2 and 4 are absent but a distinct black transverse band links up the second costal spot and the black spot on the inner margin as is found in var. *polaris*. Ground colour is normal. The specimen was taken flying on the Downs near Lewes on 15.ix.32. This specimen is unusually interesting as it shows a combination of the southern latitude form *ichnusa*, Bon. and the northern latitude form *polaris* in one and the same insect.

Brenthis selene, Schiff.—(1) With asymmetrical wing formation, left half female and right half male in size and shape. Chiddingfold. 7.vi.30.

(2) With all the internal black spots except two absent from the forewings. The six spots just inside the border crescents on the forewings are joined thereto. Hindwings, internal markings typical except that the six spots just inside crescents are joined thereto, forming streaks. Taken in N. Sussex. 9.vi.30.

Heodes (Rumicia) phlaeas, L.—3rd brood, showing straw patches as in v. *schmidtii*, Gerh. Taken at Wellfield, Co. Durham. 2.ix.28.

Aricia astrarche, Brgstr. (*medon*, Esp.).—Var. *allous*, Hb., extreme form with angular wings and orange scales completely absent. Taken at Hart, Co. Durham. 5.viii.28.

Polyommatus coridon, Pod.—(a) Var. *cinnus*, Hb. ♀ underside, *semi-syngrapha* on upperside. Royston, 1923. (b) 2 var. *semi-syngrapha*, Tutt, dwarf form, ab. *minor-semi-syngrapha*. Royston, 1921.

P. bellargus, Rott.—With hindwings coming to a point and colour paler than type; and others.

Mr. H. L. Dolton exhibited a small bred series of *Acidalia (Ptychopoda) aversata*, L. from a dark banded ♀ taken at Reading.

All the larvae were fed on Knot Grass (*Polygonum aviculare*, L.). Among the imagines are several much darker than the parent ♀. Also seven typical ♂ with no dark bands.

Mr. T. R. Eagles exhibited the more striking Coleoptera he had taken during the season 1935.

Mr. H. M. Edelsten exhibited *Comibaena pustulata*, Hufn. (*bajularia*, Schiff.), buff coloured forms and a typical specimen for comparison, from mid-Sussex. *Grammesia trigrammica*, Hufn. sooty form from mid-Sussex. *Amathes helvola*, L. (*rufina*, L.), a form from mid-Sussex with the stigmata of an ochreous buff-colour and very pronounced.

Mr. L. T. Ford exhibited *Peronea cristana*, Fb. A brood from a ♀ ab. *spadiceana*, Haw. caught April, 1935, in the I. of Wight. Only 12 imagines were bred—3 *cristalana*, Don., 2 *subfulvovittana*, Clark, 1 *subcristalana*, Steph., 4 *spadiceana*, Haw., and 2 *profanana*, Fb. Also British examples of *Coleophora erigerella*, Ford, a new species. (See "Entomologist," 1935, Vol. LXVIII. p. 114.)

Mr. J. O. T. Howard exhibited a series of *Heliothis peltigera*, Schiff., bred from larvae collected at Dungeness, 5.viii.1935.

Mr. J. R. P. Heslop exhibited British Rhopalocera including *Nymphalis antiopa*, L., Forest of Dean, 12.ix.21; *Lycaena arion*, L., Gloucestershire, 22.vi.27, and Cornwall, 22.vii.35; *Colias hyale*, L., Isle of Thanet, viii.33; and *Apatura iris*, L., vii.35.

Messrs. Russell James, Sen. and Jun., exhibited series of the British race of *Zygaena achilleae*, Esp., and the race of *Z. filipendulae*, L., from the same Scotch locality; bred series of *Cosmotriche potatoria*, L. and of *Pachygastria trifolii*, Esp.; numerous rare and local species taken in 1935 including *Drymonia chaonia*, Hb., *Leucania albipuncta*, Fb., *Aporophyla australis*, Bdv., *Agrotis cinerea*, Haw., *Boletobia fuliginaria*, L., *Heliothis dipsacea*, L., *Brachionycha* (*Asteroscopus*) *nubeculosa*, Esp., etc.; and two bred series of *Heliothis peltigera*, Schiff., showing striking differences under quite different treatment of the larvae.

Miss Kathlin Kirby exhibited an iron mantis by the celebrated iron worker, Myochin, whose best known work is the eagle now in the Victoria and Albert Museum, South Kensington.

Mr. H. A. Leeds exhibited the following aberrations of British Rhopalocera captured during 1935. *Satyrus galathea*, L., ♂ upper-side, markings entirely brightish-brown instead of black; ♀ upper-side, with left hindwing extensively black; ♀ underside, in 6th division of forewings a well developed ocellated spot amid black

band. *Euchloë cardamines*, L., ♂ upperside, forewings whitish rayed through orange patch. *Maniola jurtina*, L., gynandromorph with left forewing ♂ other wings ♀. *Rumicia phlaeas*, L., ♂ upperside, ab. *schmidtii*, Gerh. *Polyommatus coridon*, Pod., ♂ undersides, *antico-dextro-digitata* (Courv.), left forewings slightly less marked, but each forewing with *I-nigrum-semi-I-nigrum* markings; and another *semi-bi-I-nigrum-posticocaeca*, Courv. *Polyommatus icarus*, Rott., ♂ uppersides, (1) dark-lead ground; (2) very-pale-mauve. A gynandromorph, left wings entirely ♂, right wings mainly ♂ but costae and next division of both wings partially female scaled; ♂ undersides, two ab. *radiata*, Courv., ♀ undersides, (1) an extreme *antico-radiata* all seven streaks connecting with chevrons; (2) *antico-disco-elongata*, Courv.; (3) *dextro-centri-juncta*, Courv.; basal scaling black and all circles and markings dingy where usually white.

Rev. J. N. Marcon exhibited a number of aberrations and forms of British Rhopalocera including *Maniola tithonus*, L.—With albino forewings and typical hindwings, Berks. Most curious insect, albinism extends to the sexual mark, but in a less degree than to the borders.

Euphydryas (Melitaea) aurinia, Rott.—6 unusual forms bred from Dorset larvae, including one very fine underside, the hindwings being divided as to colour, the outer half pearly white with a few faint spots, the inner half entirely brick-red.

Brenthis euphrosyne, L.—1 male the forewings of which are heavily blacked over leaving a patch of fulvous between the margins and 2nd row of spots. Hindwings normal but slightly dusted with black scales; Surrey. And other forms.

Polyommatus coridon, Poda.—(1) ♀. Primaries, considerable blue scaling; secondaries, complete absence of orange spots, which are replaced by black.

(2) ♀ underside showing an irregular tendency to *digitata* form.

(3) ♂ underside of a steel colour.

(4) ♂ underside showing absence of spots in margin and ground colour tending to white.

(5) ♂ upperside, a fine slate form.

(6) ♂ upperside, ab. *fowleri*, South.

(7) ♂ upperside, extremely fine ab. *marginata*, Tutt. Black extends beyond discal spot on primaries. On secondaries black border is twice the usual width.

(8) ♂ upperside, black border replaced by pearly grey.

Argynnis cydippe, L. (*adippe*, L.).—1 very pale ground colour ♀.

3 banded forms (2 ♀, 1 ♂) from N. Forest and Berks. [1 very fine ♀, black markings coalesce and form almost a complete central black portion on primaries.]

Mr. A. M. Morley exhibited aberrant forms of numerous British Lepidoptera including *Polyommatus bellargus*, Rott. ♂ — (1) L. h.-w. melanic. (2) ♂ underside melanic, eyespots obsolescent. (3) ♀ underside, practically white. (4) ♂ underside, an emphasized ab. *digitata*, Courv. *Lithosia pallifrons*, Zell. Light and dark males (see "Ent. Record," XLIV. p. 8). *Phytometra viridaria*, Clrek. with broad purple bands. *Ptychopoda dimidiata*, Hufn., dark forms from Romney Marsh. *Metachrostis perla*, Schiff. ab. *suffusa*, Tutt. *Nonagria* (*Archanara*) *sparganii*, Esp. ab. *obsoleta*, Tutt. *Lasiocampa trifolii*, Esp. ab. *flava*, Tutt, etc.

Mr. M. Niblett exhibited Gall-causing *Cynipidae* including species new to Science; and Diptera including *Trypetidae*, *Anthomyiidae*, *Cecidomyiidae*, some species bred from unrecorded foodplants.

Mr. G. B. Oliver exhibited captures in the field, 1935 :—

Melitaea athalia, Rott. Male with straw ground colour. Kent.

And from Bucks :—*Aglaïs urticae*, L. Male. Primaries: three costal spots confluent, minus central spots and marginal blue spots. Secondaries: uniformly blackish. (Probably from a larva which had been turned down in a selected locality.)

Polygonia c-album, L. Male. Upperside ground colour of a deep terra-cotta shade; and another with the three costal spots confluent and carried around the outer margin to the inner margin. Secondaries: mainly blackish.

Polyommatus bellargus, Rott. Pale underside, spotting mostly obsolete, bistre-brown ground colour extending to extreme border, obliterating all normal white of the lunules.

Mr. J. F. Perkins exhibited the parasites of the Lepidoptera *Gonepteryx rhamni*, L., *Cosmotriche potatoria*, L., *Plutella maculipennis*, Curt, etc.

Mr. A. G. Peyton exhibited aberrations of British Lepidoptera including a *Maniola tithonus*, L. in which the dark brown is replaced by pale pinkish ochreous, a pale *Drymonia trimacula*, Esp., etc.

Mr. N. D. Riley exhibited examples of each of seven successive broods of *Lycaena dispar* ssp. *batavus*, Holl. reared in Wood Walton Fen, 1928-1934. Also two generations of a cross between *L. dispar* ssp. *rutilus*, Wern., and *L. dispar* ssp. *batavus*.

Mr. A. G. B. Russell exhibited very fine melanic examples of

Stauropus fagi, L. from Sussex; *Xylomiges conspicillaris*, L. from Somerset; melanic forms of *Xylophasia monoglypha*, Hufn. and a beautiful example of *Triphaena pronuba*, L. with black forewings, from Argyll; numerous species from Swanage, including series of *Leucania albipuncta*, L., examples of *L. vitellina*, L., *Neuria reticulata*, Vill. and *Metachrostis* (*Bryophila*) *muralis*, Forst. (*glandifera*, Hb.), several specimens of *Dasypolia templi*, Thnbrg., a species of particular interest in this new and unexpected locality for it; other Dorset insects include *Agrotis vestigialis*, Rott. ab. *albidion*, Ptron., *A. cinerea*, Hb. ab. *brunnea*, Hb. and of especial interest were two specimens of *Acidalia rubiginata*, Hufn., taken at light at Swanage. These are the first examples of the insect to be recorded for Dorset and are, moreover, remarkable for their unusual size, being appreciably larger than the form occurring in the Breck district, with which this insect is generally associated.

Mr. S. G. Castle-Russell exhibited the following aberrations of British Rhopalocera. :—

Gonepteryx rhamni, L. A male with the tips of forewings marked with red. Reading.

Maniola jurtina, L. Three bleached forms and a female with abnormally large spots on forewings. New Forest and Winchester.

Aphantopus hyperantus, L. Specimens with lanceolate markings, one being extreme in size. New Forest.

Eumenis semele, L. Two males entirely spotless. I. of Wight.

Limenitis camilla, L. (*sibilla*, L.). An underside of var. *nigrata*, Weym. New Forest.

Euchloë cardamines, L. A gynandromorphous female; underside with red lines on forewings. Winchester. Bred.

Coenonympha pamphilus, L. A very pale form. Winchester.

Erynnis tages, L. An unusually dark form. Winchester.

Polyommatus coridon, Poda. (1) A series of male and female aberrational forms including two very pale blue males with a pale female. Hampshire, I. of Wight.

(2) A female ab. *striata*, Tutt, and a female with suffused markings and minus spotting on underside.

(3) A female underside of *obsoleta* type with deep brown ground colour.

(4) An exceptionally broad-bordered form of var. *syngrapha*, Kef.

(5) An underside of var. *syngrapha* suffused with white.

(6) Various forms of undersides with obsolete spotting. Hampshire, I. of Wight.

P. bellargus, Rott. Upperside forms, three having pale yellow spotting on borders instead of usual red. S. Hants. One streaked and two *obsoleta*, Tutt, underside forms. N. Kent.

Mr. S. Wakely exhibited specimens of *Bactra scirpicolana*, Pierce, from Burnham-on-Crouch, Essex, a species hitherto confused with *B. lanceolana*, Hb. (see F. N. Pierce in "Entomologist," 1935, Vol. LXXIII. p. 148); a series of *Telphusa alburnella*, Dup., hitherto unrecorded for the British Isles, taken at Strensall, Yorks, by A. Smith; also a very fine melanic specimen of *Chiasmia clathrata*, L. ab. *nocturnata*, Fuchs. (*nigricans*, Obthr.) taken on 20th August in the Isle of Wight; and a large number of specimens representative of about 250 species taken during the past season.

Mr. H. O. Wells exhibited aberrations of British Rhopalocera taken in Hertfordshire in 1935 including *Polyommatus coridon*, ab. *fowleri*, South, also ab. *obsoleta*, Tutt, and ab. *semi-obsoleta*, Tutt; and underside aberrations of *P. icarus*, Rott., and of *Plebeius aegon*, Schiff. (*argus*, L.)

Rev. George Wheeler exhibited aberrations of Apaturids from the Jura. Series of *A. iris*, L. ab. *iole*, Schiff. and transitions. *A. ilia*, Hb., with series of transitions from ab. *clytie*, Hb. to ab. *eos*, Rossi; also ab. *iliales*, Mitis.

Mr. H. B. Williams, LL.D., exhibited a bred series of *Abraxas grossulariata*, L., from the London district including among the forms shown ab. *axantha*, Rayn.; *Polyommatus bellargus*, Rott. ab. *obsoleta*, Tutt and *P. coridon*, Poda. with ab. *inaequalis*, Tutt, ab. *obsoleta*, Tutt, ab. *striata*, Tutt, ab. *irregularis*, Tutt, etc.

Dr. C. G. M. de Worms exhibited selected series of British Macrolepidoptera taken during 1935 from localities spread over Scotland, Lake District, Kent, Dorset, etc. Also a remarkable radiated aberration of *Argynnis aglaia*, L., taken on the Sussex Downs in July; and 4 male *Drepana harpagula*, Esp. (*sicula*, Hb.) taken at light in Leigh Woods, Bristol.

Mr. S. R. Ashby exhibited 2 cabinet drawers of British *Carabidae* (Col.).

Rev. E. B. Ashby (the late) exhibited the *Heodes* (*Chrysophanus*) forms he met with in July last in the Mont Dore district of France, viz. *hippotoë*, L., *eurydice*, Rott. and *chryseis*, Hb.

Mr. R. W. Attwood exhibited many British species of Lepidoptera including *Orgyia gonostigma*, Fb., *Mellinia ocellaris*, Bork., *Characlea umbra*, Hufn., *Euchloris smaragdaria*, Fb. and *Brepheos notha*, Hb.

Mr. T. L. Barnett exhibited a series of *Coenonympha tullia*, Müll.



ABERRATION OF ARGYNNIS AGLAIA.



(*tiphon*, Rott.), form *philoæenus*, Esp. from Witherslack and numerous aberrative British Rhopalocera.

Dr. G. V. Bull exhibited dark forms of *Xylophasia monoglypha*, Hufn. and *Eupithecia insigniata*, Hb. (*consignata*, Bork.) both from Kent; and other aberrations.

Mr. A. A. W. Buckstone exhibited numerous aberrations of British Rhopalocera and ova of *Thecla* (*Zephyrus*) *quercus*, L., and larvae and pupae of *Pieris napi*, L. from 3rd brood female.

Mr. G. A. Cole, Mr. Peter Gow, Mr. C. N. Hawkins, Mr. C. E. S. Hicks, Mr. H. G. Jones, Col. N. H. Kenham, Mr. H. B. Lawson, Mr. Quibell and Mr. Clifford Wells exhibited their chief captures of the season.

Mr. H. Moore exhibited some insects of economic importance.

Mr. L. W. Newman exhibited long series of selected bred aberrations of *Papilio machaon*, L. and of *Euphydryas* (*Melitaea*) *aurinia*, Rott.; the latter from Co. Kerry. Also a considerable number of preserved larvae.

Mr. A. H. Peach and Mr. C. G. Priest exhibited some British Lépidoptera, captures of the year.

Rev. A. Stiff exhibited Irish *Polyommatus icarus*, Rott. and other Rhopalocera.

Mr. Hy. J. Turner exhibited exotic Lépidoptera recently received from the upper stretches of the Amazon (Ecuador).

Mr. Dennis exhibited a frame of lantern slides of natural history subjects.

Mr. E. A. Baynes exhibited a bred series of *Erastria venustula*, Hb. from Essex, and various aberrations of Rhopalocera.

Mr. Hugh Main exhibited the yellow forms of *Pieris napi*, L. which he had previously shown at the ordinary meetings of the Society.

Mr. N. Wykes exhibited East African Butterflies illustrative of Mimicry.

Mr. G. White exhibited a case showing the life-history of *Hyloicus pinastri*, L.

Mr. Jas. A. Stephens exhibited a few rare and local beetles including *Langelandia anophthalmus*, Aub. taken at Chatham this year.

Mr. and Mrs. Stanley-Smith exhibited a bred series of *Mellinea ocellaris*, Bork., and *Agrotis vestigialis*, Rott. and *A. ripae*, Hb.

Dr. E. Scott exhibited a number of European species of *Coenonympha* including *C. hero*, L. and *C. oedippus*, F.

14th NOVEMBER, 1935.

The PRESIDENT in the Chair.

Dr. Harold King exhibited a case of *Mellinia ocellaris*, Bork., bred from catkins collected from felled black poplar trees in Suffolk in April. Out of 100 larvae found in the catkins, 90 emerged as *Mellinia ocellaris*, 4 as *Amathes macilentata*, Hb., and 2 as *A. circellaris*, Hufn. About 18% of the *M. ocellaris* were var. *intermedia*, Hab.

Mr. M. Niblett exhibited galls caused by the following species of Coleoptera. *Apion loti*, Kirby, in seed pods of *Lotus corniculatus*, L., *Miarus campanulae*, L., in seed capsules of *Campanula rotundifolia*, L., *Gymnetron noctis*, Herbst., in seed capsules of *Linaria vulgaris*, L., *Ceuthorrhynchus pleurostigma*, Marsh., in roots of *Alyssum saxatile*.

Dr. H. B. Williams exhibited 1. *Abraxas grossulariata*, L. bred 1935, including dark forms from Hampton and N. London, ab. *axantha*, Rayn. from Hampton, a partially rayed form from N.W. London and a heterozygote *varleyata*, Porr. × type, quite typical.

2. *Polyommatus (Lysandra) bellargus*, Rott. ab. *obsoleta*, Tutt, I. of Wight, Aug. 1935. *P. coridon*, Poda., from I. of Wight, Aug. 1935, including 2 ♀ ab. *inaequalis*, Tutt, left hindwing with bright blue and greenish-blue streaks respectively, ♂ ab. *striata*, Tutt, ab. *obsoleta*, Tutt, ab. *irregularis*, Tutt, etc.

3. *Xanthia fulvago*, L., a varied series including ab. *flavescens*, Esp. bred from Esher larvae, 1935.

Mr. S. Wakely exhibited *Crambus contaminellus*, Hb. and read the following note:—*Crambus contaminellus* is a very local insect, which used to be taken at Blackheath by the older collectors. The series shown were all taken during this season at Upper Norwood, being attracted by light to the house windows. The garden borders the grounds of the Norwood Club, and it is of interest to record the insect from a new locality. In August, 1931, I took four specimens of the moth at Barnes Common, again in the London district. Deal is given as another locality, and I understand the insect is still taken there.

Dr. de Worms exhibited the larvae of *Caradrina ambigua*, Fb.

Mr. Coulson exhibited long series of British Rhynchophora (Col.) to illustrate his Paper "The British Rhynchophora." (See Trans.)

Miss Brooke, the Society's delegate to the Jubilee Meeting of the Dublin Naturalists' Field Club, July, 1935, read a Report of the Proceedings.

Report of the Dublin Naturalists' Field Club Jubilee Meeting, July, 1935.

By Miss W. M. A. BROOKE (The Society's Delegate).

Read 9th January, 1936.

The Dublin Naturalists' Field Club celebrated the Jubilee of their foundation with day excursions and evening meetings, that proved most delightful for all those privileged to take part in them. Dublin, lying but a few miles from the sea and in close touch with wild and beautiful mountain scenery, is a particularly fine centre for Naturalists. The Club was most fortunate in the weather which remained fine and hot, for some perhaps almost too hot, during the whole of the festival.

The Hon. Secretary of the Dublin Naturalists' Field Club, Mr. C. W. Allen, had been most kind and helpful in giving the delegates information and advice as to the journey and the Dublin transport services. Arrangements had been made for the accommodation of lady delegates at Trinity Hall, the women's part of Trinity College. We were provided with every comfort by the warden, Miss Cunningham, who made our stay a very happy one.

Some twenty delegates were entertained at Trinity Hall and as we were representing societies scattered widely over Ireland, Scotland and England we found a great deal of interesting matter to discuss together.

At dinner on the 11th we were joined by many of the more prominent members of the Dublin Naturalists' Field Club, who escorted us later to the evening meeting. This took the form of an Exhibition of specimens of local Natural History, including an interesting collection of rare plants from County Wicklow, and an exhibit of the food of the Salmon.

Dr. Lloyd Praeger welcomed the Club's guests and explained the arrangements for the following day, after which we partook of tea and refreshments.

Friday, 12th July being the chief day of the celebrations we all enjoyed a whole day excursion by motor coach. Three alternative outings were arranged :—to Glendalough in the Wicklow Mountains, to the Valleys of the King's River and the Upper Liffey, and to the Boyne Valley. I decided to go to the Upper Liffey as being the excursion with the greatest opening for nature study.

Our leader Mr. Farrington, a keen geologist, had taken the trouble

to supply each member of his party with a typed description of the tour and a sketch map of the route. The coach carried us by a gradual ascent up the foothills of the Wicklow Mountains to a considerable height, when we left it and walked to the top of Golden Hill, from which we obtained a fine view of the surrounding district, of the basin of the Liffey and of the shore deposits of the glacial lake, that at one time occupied the valley. We descended the further side of the hill, explored the river, and were again picked up by our coach.

At Killough bog we made the longest break of the day, and here the party divided, the geologists visiting the granite quarries at Ballyknocken, while the botanists led by Mr. M. J. Gorman explored the bog. Owing to the exceptionally dry summer this was not nearly so wet as had been expected and we were able to cross it without much difficulty. A considerable number of plants of *Drosera anglica*, Huds., were found as well as the commoner *Drosera rotundifolia*, L., though strange to say *Pinguicula vulgaris*, L., did not seem to grow there. Plants of *Utricularia vulgaris*, L., were extracted from a small stream. *U. intermedia*, Hayne., could not be discovered, though it should have been present. We also found the rare *Andromeda polifolia*, L., and *Rhynchospora alba*, Vahl. *Orchis maculata*, L., was very plentiful and so were many of the commoner bog plants such as *Eriophorum polystachion*, L., and *E. vaginatum*, L. After lunch we proceeded up the King's River valley, and most of us walked down the hill to Lockstown bridge, passing *Viola lutea*, Huds., growing on the banks. A feature that surprised English botanists was the quantities of *Orchis pyramidalis*, L., that grew on the hillsides; several other plants we regard as rare were quite plentiful.

A little further on we again left the coach for a walk of some two miles around the side of Slieve Corragh to see a narrow cutting through which the glacial lake had drained. From a point above and right on the edge of the gorge we obtained a unique and wonderful view.

We saw but few butterflies in the course of the day and those mostly Meadow Browns. Mr. C. W. Allen took a dwarf female of *Sirex gigas*, L., and some bees, *Andrena coitana*, Kirb., *A. dorsata*, Kirb., *Hylaeus communis*, Nyl., and *Nomada ruficornis*, L.,

On this expedition to the Boyne Valley the dragonflies *Calopteryx virgo*, L., *Pyrrosoma nymphula*, Sulz., *Enallagma cyathigerum*, Charp., *Libellula quadrimaculata*, L., and the butterflies *Argynnis aglaia*, L., and *Maniola jurtina*, L., were reported.

The Jubilee Meeting took place at 8 p.m. in the rooms of the Royal Irish Academy and was presided over by Dr. R. Lloyd Praeger, the distinguished botanist, as acting president of the Dublin Naturalists Field Club, the Club having unfortunately lost its president Miss Eileen Malone early in the year.

Dr. Praeger has been a member of the Club for forty years and gave an account of its history since its commencement in 1885. Dublin having so many learned societies the Field Club membership has never been greater than the 200 it numbers to-day, yet it established the "Irish Naturalists' Journal," which has furnished a most valuable record of the fauna, flora and geology of the country.

A number of delegates gave congratulatory addresses, in which several from North Ireland made an appeal for closer union and more combined meetings with the Belfast Club and other smaller Clubs in the North.

On Saturday the 13th, which concluded the official programme, there were three alternative morning excursions, the Zoological Gardens with their famous lions, conducted by Dr. Praeger and Mr. Mason; the National Museum; and the Botanic Gardens, led by the Director, Mr. J. W. Besant.

I joined the party visiting the Museum and spent a most interesting morning. Dr. P. O'Connor conducted us around the Zoological department, where we spent most of the time in the Irish section; the most striking feature of which was the remains of the Irish Deer dug from the peat bogs. In the Botanical department we were shown some of Ireland's rare plants.

In the afternoon the Club was taken by Dr. Praeger and Mr. Farrington for a farewell excursion to Bray Head, but a few delegates, who were anxious to do so, were invited to accompany Mr. Hudson to the Malahide Ternery. The numbers were restricted for fear of disturbing the young birds. Some seven or eight of us visited the Ternery on an isthmus, only a short distance from the City. The eggs and young lay scattered over the sand, some simply in scooped out depressions, others surrounded by a little dried grass. Both eggs and young are so like the sand in colouring, that one is in constant danger of treading on them, and we found several that had been killed. The young crouch in any depression if not able to run away in time. The parent birds wheeled threateningly overhead, striking once at a delegate's hat, but by lying down I was able to sketch the little ones and to watch the old birds bring them food.

28th NOVEMBER, 1935.

The PRESIDENT in the Chair.

The following 8 new members were elected:—Messrs. G. Milbarrow, of Stockwell; J. A. P. Russell, of Swanage; D. W. Royffe, of Clapham; G. J. Sard, of Balham; S. G. W. Norton, of Purley; E. Streeter, of Petworth; E. Britton, of Westbourne Park; and Capt. J. H. B. Lowe, London, W.14.

Dr. Cockayne exhibited a short bred series of *Ptychopoda eburnata*, Wocke. (*contiguaria*, Hb.) from Penmaenmawr, including several rather dark forms, 2nd and 3rd generations.

Mr. C. N. Hawkins a varied series of *Xanthia* (*Ochria*) *aurago*, Fb. from Sussex, bred from ova received from Mr. A. J. Wightman.

Mrs. Stanley Smith communicated a note on a curiously marked pied blackbird in Huntingdon:—

A piebald blackbird is very often in our garden, and has been about for weeks. He is a lovely black, and at first had a ruffle of soft white feathers around his neck curling outwards, white each side of his face and a white streak from his beak over his head and joining the white ruffle at the back. That ruffle has now turned into sleek white feathers lying close. Mrs. Smith also reported a *Polyommatus c-album* on 27th Oct., in perfect condition on cotoneaster, and that *Uamearis lucina* was still emerging.

12th DECEMBER, 1935.

The PRESIDENT in the Chair.

Dr. Blair exhibited some elm leaves shewing series of holes, in some cases parallel with the midrib, in others across it, and asked if they could be recognized as the work of any particular insect, but no definite opinion was obtained. It was, however, suggested that the damage was due to faulty development of the buds.

Mr. H. Moore exhibited the Noctuid *Anua tirhaca*, Cram. (*tirrhaca*, auct.) a species found around the Mediterranean area and extending to Asia Minor, India and China. It was closely allied to the species under *Catocala*.

Dr. Cockayne exhibited a short series *Leucania albipuncta*, Fb. bred under a fairly high temperature from ova laid by a Dungeness ♀ taken last September, and drew attention to the variation shown, the series comprising the typical form, ab. *rufa*, Tutt; ab.

suffusa, Tutt, and a form seemingly comprising the characters of both *rufa* and *suffusa*. A note on the brood will appear in the "Entomologist's Record" in due course.

Mr. G. B. Oliver exhibited series of bred forms of *Colias croceus*, Frery., including ab. *helice*, Hb.; ab. *pallida*, Tutt, ♀, creamy white; ab. *obsoleta*, Tutt, with spots in margin obsolete; ab. *chrysothème*, Steph., orange yellow; all originating from a *pallida* form taken at Folkestone in June 1935.

Dr. Blair read Notes on his visit to Spain for the 6th Entomological Congress in August and September.

Report of the VIth International Entomological Congress at Madrid, 6th-12th Sept. 1935.

By DR. K. G. BLAIR, F.R.E.S.—Read 12th December, 1935.

The Congress itself was preceded by a motor coach trip to the Picos de Europa in the north of Spain, and followed by a trip through southern Spain and to the Canary Islands. In this report I propose to relate my own experiences, which included the pre-convention trip, but not the later one.

Our party of 8, including Messrs. Main and Tams from this Society, left Waterloo at 7.15 p.m. on 27th August, picking up Mr. Riley at Southampton and arriving at St. Malo early next morning. The weather through western France was wet and stormy. At Bordeaux we joined the train from Paris, in which was another contingent of various nationalities, and reached Irun, on the Spanish frontier, that evening. Further arrivals next morning completed the coach party and we set off, 29 in a long single-deck bus, in addition to the guide and bus crew, 32 in all. The party was composed as follows:—13 British representatives, 4 Spanish, 2 each Dutch and French, 2 Greek and one each German, Austrian, Pole and Finn.

Leaving Irun at 8.30 a.m., we made short stops at San Sebastian and Bilbao and reached Santander at 9 p.m. Next morning we visited the old-world village of Santillana, and the neighbouring caves of Altamira famous on account of the prehistoric drawings on walls and roof. The cave with the pictures was rediscovered in 1868. For the convenience of visitors the floor has been deepened and levelled, a portion of the original floor in the main chamber being left as a central table upon which one can lie to observe the

figures above one's head. The best of these are on the roof, which is fairly smooth though somewhat uneven, advantage being taken of the low elevations in the drawing of the figures. The rock appears to be a softish kind of limestone, and is crossed by numerous cracks but is dry with little water percolating. Entomologically it was a disappointment, no insects being discovered. The second cave close by, found only in 1928, contains no drawings but is wetter and in its deeper recesses has some beautiful stalagmitic formations; beetles have, I believe, been found in it, though rarely.

In the afternoon we were entertained to tea at the University of Santander, formerly a royal summer palace, but now an international university for summer courses for post-graduate students.

Next morning we left for the Picos, the road traversing the precipitous limestone gorge of La Hernida with its wonderful scenery. We arrived at Espinama, near the head of one of the valleys running up into the massif, as dusk was falling, and here the party divided, a dozen of the more energetic continuing on ponies to the Refugio de Aliva for the night, preliminary to the ascent next day. The remainder, including myself, stopped at Espinama, whence next morning we had an interesting collecting trip on foot further up the valley. Here butterflies were plentiful, including the Queen of Spain Fritillary, some Coppers and Skippers new to me, while Clouded Yellows and various Blues appeared more familiar. Beetles however were few, though the climbing party obtained some good local species near the summit. Next morning the climbers rejoined us and we continued to Covadonga at the western end of the massif and the next day went in small cars to Lake Enol. Unfortunately the weather was poor, cold and misty with rain at times, and no butterflies were seen but some beetles were obtained, mostly *Carabidae* and *Staphylinidae* from under stones. A cave, from which beetles are supposed to have been first obtained by Dr. David Sharp some 50 years ago, was visited for beetles but none was found.

The next day was a long one, covering some 300 miles to Madrid. Hitherto the country had been fresh and green, much greener than we had left it in England, and in many features not very dissimilar from the wilder parts of our own, but soon we left the mountains and were on the Central Plain of Spain. Everything here was dried up and brown, the only grazing ground the wide, shallow, dried-up river beds, and the whole country apparently desert, recalling vividly to some of us, scenes of North Africa and Palestine; the villages being built of mud blocks of the same colour as the

earth, are almost invisible at a little distance. The appearance of desert however was misleading, as harvest was just over and the crops gathered in. The whole plain in reality is very fertile and almost completely under cultivation. Every village and farm had its threshing floor of bare hard earth, the threshing being done in some parts by striking small sheaves of corn on sloping frames, but more usually by means of broad low sledges drawn round and round over the corn by oxen, and the chaff winnowed out by tossing the corn in the air. Unfortunately we had no opportunity of watching one of these yards at work. With short halts at the old cities of Leon and Valladolid we crossed the Sierra de Guadarrama after midnight and at last saw below us the lights of Madrid in the distance, with smaller groups of lights in between, and finally reached our destination about 3.30 a.m. when we dispersed to our several hotels and hostels.

Thursday, 5th Sept., was devoted to registering our arrival, booking tickets for the various excursions and entertainments, and collecting mail and literature issued in connection with the Congress, followed by an informal reunion in the evening. Some 400 names were listed, representing 30 countries, though probably not many more than 300 were present. The meetings were held in the various buildings of the University situated in spacious grounds on the hills to the north of the city, except on the 8th September when they were held in the former Palace of El Escorial.

On 6th September the Congress was opened by his Excellency the President of the Republic, followed by an address by the President of the Congress, the veteran Professor Ignacio Bolivar, and speeches by numerous foreign delegates. The afternoon was occupied with an excursion to the former royal palace of El Pardo.

The next few days were devoted to the meetings of the 10 sections into which the business of the Congress was divided, and many interesting papers were read. On the evening of the 7th there was a reception by the President of the Republic at the Palacio Nacional.

On the 8th there was a general excursion to the Palace of El Escorial, where the sectional meetings were held, and opportunity was given for collecting in this classic locality. On the 9th, in addition to the sectional meetings, there was a reception at the University, when Honorary Degrees were conferred upon distinguished foreign entomologists and in the evening a reception by the Mayor of Madrid.

The 10th was occupied by a visit to the Alpine Biological Station

in the Sierra de Guadarrama, continuing to La Granja and Segovia, with further opportunities of collecting. On the afternoon of the 11th there was an excursion to the ancient and picturesque old city of Toledo, followed in the evening by a fiesta of Spanish Art. The morning of the 12th brought the closing session with the announcement that the next Congress would be held in Berlin. An excursion to Aranjuez occupied the afternoon, while the final banquet was given at the Ritz Hotel in the evening.

The next day the party broke up, the post-convention tour going by way of Granada, the Sierra Nevada and Malaga to Cadiz, thence to Gran Canaria and Tenerife, returning to Madrid on 1st Oct. via Seville and Cordoba. Other members went on to Lisbon for the Zoological Congress immediately following, while the rest of us dispersed to our several homes, all bringing away with us recollections of a most friendly and enjoyable meeting accompanied by lavish hospitality and blessed with glorious weather.

9th JANUARY, 1936.

The PRESIDENT in the Chair.

Mr. R. H. Briegson, of Sidcup, was elected a member.

Mr. M. Niblett exhibited the Cynipid (gall-wasp) *Trigonaspis renum*, Gir., an apterous species, bred from galls on the oak, *Quercus robur*, L. 29.xii.35.

Mr. Collins exhibited a series of very remarkable aberrations of *Brenthis selene*, Schiff. taken in Czechoslovakia.

Mr. E. J. Bunnett exhibited an example of *Anarta myrtilli*, L. recently bred.

Mr. D. W. Royffe exhibited *Lethocerus indicus*, Stal, a large species of "water-bug" from the Indian region.

Dr. Bull reported observing a specimen of *Phigalia pedaria*, Fb. on the 29th December last.

Messrs. T. R. Eagles and M. F. Bliss also exhibited.

Miss L. Stephens gave an account of a collecting expedition up country in South Africa, illustrating her address with a fine series of lantern slides.

23rd JANUARY, 1936.

ANNUAL MEETING.

Mr. E. E. SYMS, F.R.E.S., PRESIDENT in the Chair.

The Minutes of the last Annual Meeting were agreed to and signed.

The Report of the Treasurer, the Financial Statement, the Balance Sheet and the Council's Report for the past twelve months were presented, read and approved.

The following is a List of Officers and Council who were declared as elected to serve for the year 1936-7.

President.—M. Niblett. *Vice Presidents*.—E. E. Syms, F.R.E.S., and F. J. Coulson. *Hon. Treasurer*.—T. R. Eagles. *Hon. Librarian*.—E. E. Syms, F.R.E.S. *Hon. Editor of Proceedings*.—Hy. J. Turner, F.R.E.S., F.R.H.S. *Hon. Secretaries*.—S. N. A. Jacobs (Corresponding). H. G. Denvil (Minuting) *Hon. Lanternist*.—J. H. Adkin. *Council*.—G. V. Bull, B.A., M.B.; Dr. K. G. Blair, F.R.E.S.; F. D. Coote, F.R.E.S.; Dr. H. King, F.R.S.; B. J. MacNulty; F. Stanley-Smith; Mrs. M. Stanley-Smith; A. E. Tonge, F.R.E.S.; S. Wakely; Dr. C. G. M. de Worms, M.A., F.R.E.S., M.B.O.U. etc.

The President then read his Address, which was illustrated by Lantern Slides, and vacated the Chair which was taken by the President elect Mr. M. Niblett.

Votes of Thanks were then passed to the retiring President, Officers, Council and Auditors for their services during the past year.

ORDINARY MEETING.

Mr. M. NIBLETT, PRESIDENT in the Chair.

Mr. Wallis Norton exhibited the dark heath form of *Plebeius aegon*, Schiff. from the New Forest.

Mr. E. J. Bunnett reported that the larvae of a fungus gnat had remained immersed in water for 10 days, at the end of which time 2 were still alive. It was noted that life was at a standstill with many organisms during cold weather, and that possibly there may have been a slight amount of food matter dissolved in the water.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read 23rd January, 1936

By E. E. SYMS, F.R.E.S., *President.*

LADIES and GENTLEMEN. The Report of the Treasurer and the Council's Report, which you have just heard read, show that the Society still continues to fulfil the object for which it was formed. The number of new members, the large attendance at our meetings and excursions, and the number of visitors at our Annual Exhibition are all evidence of the continued usefulness of our Society. It is with regret that we part with our Treasurer, who has asked to be relieved of his office after 17 years of successful work. I am sure you will join with me in congratulating him on the financial progress that the Society has made during his term of office. From the Treasurer's report you will have noticed that the Society has now reached a point, where the members' subscriptions and the expenditure nearly balance, the admission of new members will therefore enable the Society to increase its usefulness, and also assist in making the work of our new Treasurer light.

The Volume of Proceedings, published during the year, conveys, better than by any other means, the varied interests of our members. Excellent as these Proceedings are, they might be made more useful by the addition of more detailed reports of the exhibits at our meetings. That these reports are poor is not due to your Officers but to those who, like myself, do not provide the Secretary with written notes of their exhibits. Thus much original work that necessitated hours of patient labour is lost, and others, who take up the same work later, have to start again at the beginning. All our members spend time trying to arrange their exhibit in such a way that it may be seen at its best, so I ask that in future you should think of the report of the exhibit in the same way and provide

the Secretary with written notes so that they may be incorporated in the Proceedings. This is of particular importance this coming year as you have just appointed a Minuting Secretary. In this connection I should like to remind you that there are many members, whose only link with the Society is the published Proceedings, and by enlarging and improving these Proceedings we may not only retain, but increase the number of members.

During the past year the Society has lost by death one of its oldest and most distinguished members, Robert Adkin. He was born at Lewisham in 1849 and lived in that neighbourhood until 1915, when he went to live at Eastbourne, and there he died, after an illness of a few months, on 21st May, 1935, at the age of 86 years. By his death the Society has lost a good friend and benefactor, one who, from the time of joining in 1882 until his death, took an intense interest in all its activities. The members soon recognized his ability, for in 1883 he was elected to the Council, becoming President in 1886-7, again in 1897 and for a third time in 1906-7. He was a most regular exhibitor at our meetings and during his long association with us has published in our Proceedings some 53 papers. These deal with the Lepidoptera, his studies being confined principally to British species. Of his many contributions to the literature of entomology, his admirable account of the "Butterflies and Moths of Eastbourne" is perhaps the most important. This is published in the "Transactions of the Natural History Society of Eastbourne." For many years he represented our Society at the Annual Congress of the South Eastern Union of Scientific Societies, and also at the British Association. Under his will the Society has received the sum of £200 and also his magnificent collection of lantern slides.

Among those, not members of this Society, who have passed away during the year, mention must be made of Arthur Leslie Rayward, who died in October last in his 69th year. He was a member of this Society from 1902 until 1929 when he resigned on going to live at Eastbourne. He was an excellent microscopist, particularly interested in the Lepidoptera and made many slides of the genitalia of these insects. He left instructions that these slides and the cabinet that contained them were to be offered to this Society. I need hardly tell you that they were gladly accepted.

I will now ask you to rise for a few moments as a token of respect to the memories of these colleagues.

I now turn to the special subject of my address.

SOME NOTES ON THE BIOLOGY OF *CHRYSOPA SEPTEMPUNCTATA*, WES.

For many years I have been observing the insects that live and breed in my garden at Wanstead and have watched the life-history of *Chrysopa septempunctata*. The greatest enemy of the gardener is, without doubt, the green-fly. The damage done by each insect is very small but the peculiar method of reproduction of these insects enables them, under favourable conditions, to increase at such a rate as to make this damage considerable. Many insects visit the garden to feed upon these green-fly, or to oviposit near them, so that their young larvae shall have an abundant supply of food around them when they hatch. Among the Neuropterous family *Chrysopidae*, *Chrysopa septempunctata* is a regular visitor, and feeds both as a larva and imago on these green-flies. The *Chrysopidae* are so well known that they have received three common names, being called "green lacewings," "golden eyes" and also "stink flies." All these names are very appropriate for the adults have beautiful green lace-like wings, their eyes at dusk shine like spheres of gold, and when handled they emit a particularly offensive odour.

The name *septempunctata* is given to this insect, because the head has seven blackish spots, arranged, one between the bases of the antennae, one below each antenna, a spot on each gena and a streak on each side of the clypeus. These spots are sometimes very small and occasionally the spots below the antennae are missing.

During the day the adult insects rest upon the under surface of leaves, but at dusk they fly with a slow weak flight. It is at dusk that the eggs are laid, each being placed at the top of a short stalk, which is generally attached to the under surface of a leaf, but occasionally is on the bark. On one occasion I was successful in finding a female at work ovipositing. She was resting on the under surface of a plum leaf, so without disturbing her, observation was kept and it was seen that she first placed the tip of her abdomen against the surface of the leaf and then a globule of transparent liquid exuded. Then the abdomen was raised slowly and the fluid drawn out into a thread, which hardened upon exposure to the air and immediately became white. When this thread was about 8mm. long there was a slight pause before the egg appeared. Without shifting her position on the leaf the tip of the abdomen was again brought into contact with the leaf at a short distance from the first spot and a second egg deposited as before. This was repeated several times before she changed her position; in all there were 24 ova. These ova are

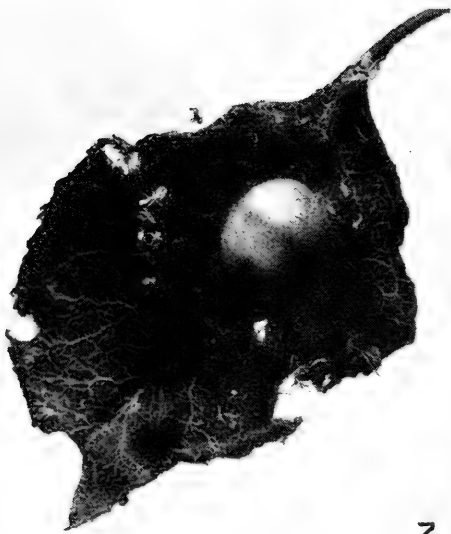




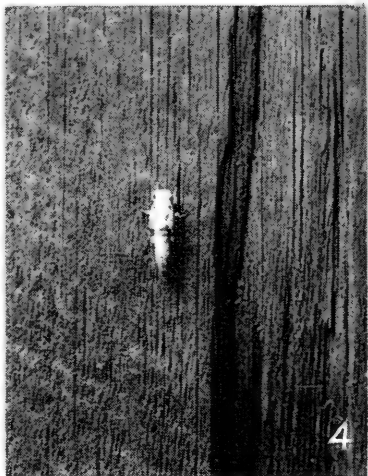
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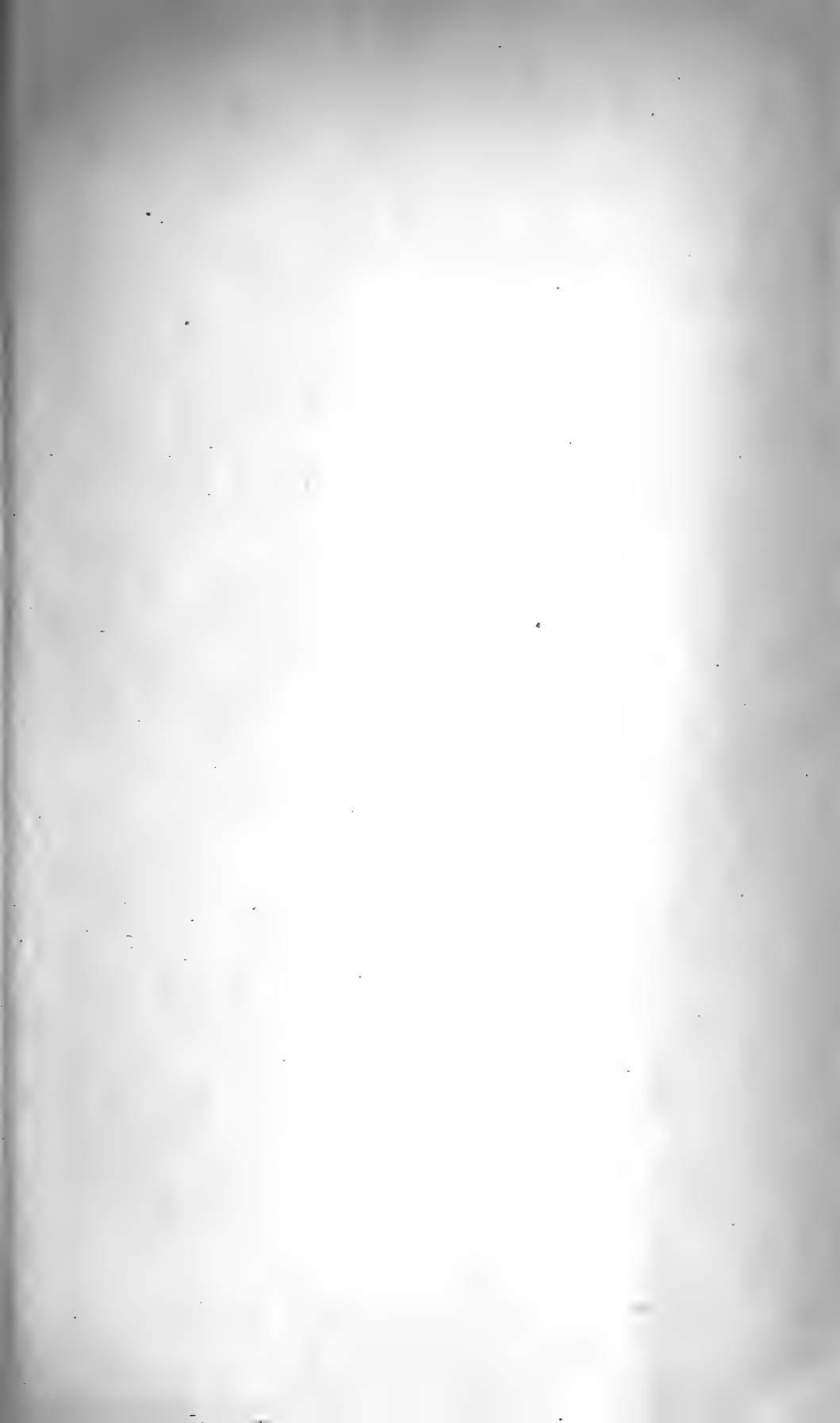
Photo: E. E. Syme.

1. Ova.

2. Larva.

3. Cocoon.

4. Pupa.



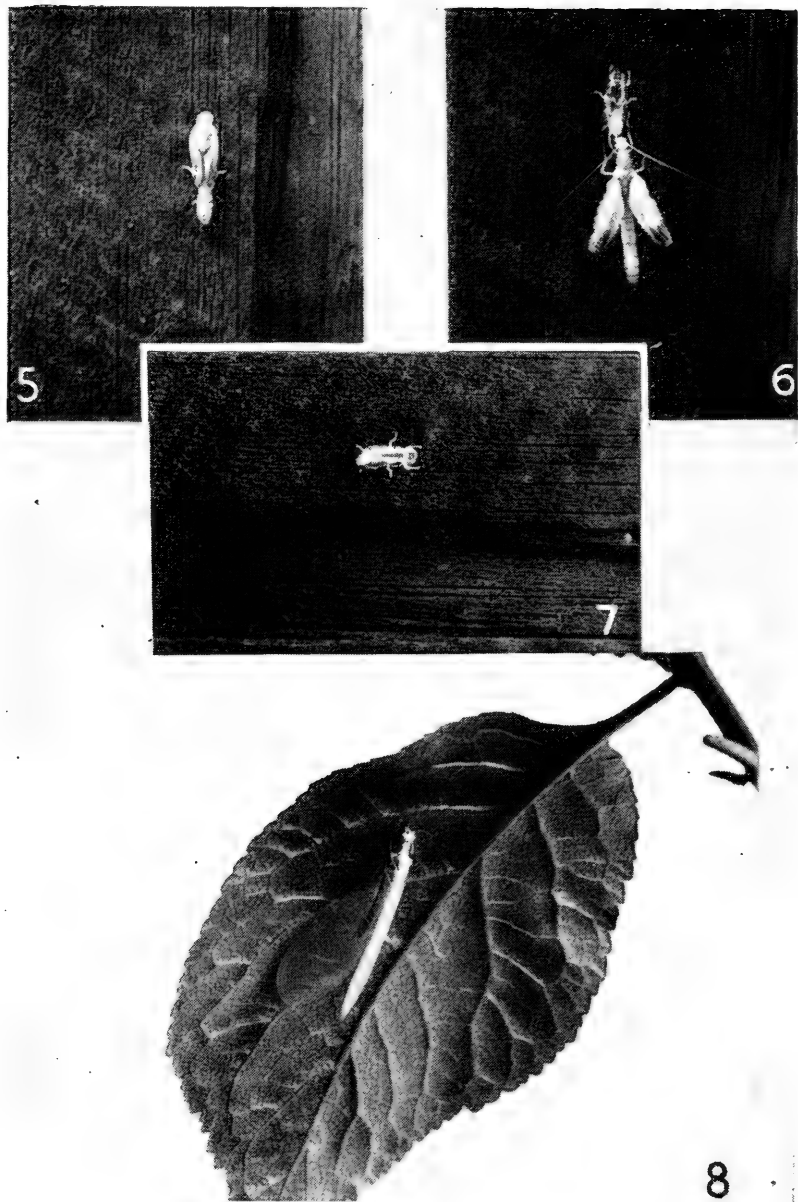


Photo: E. E. Syme.

5. Emerging.

7. Empty Skin.

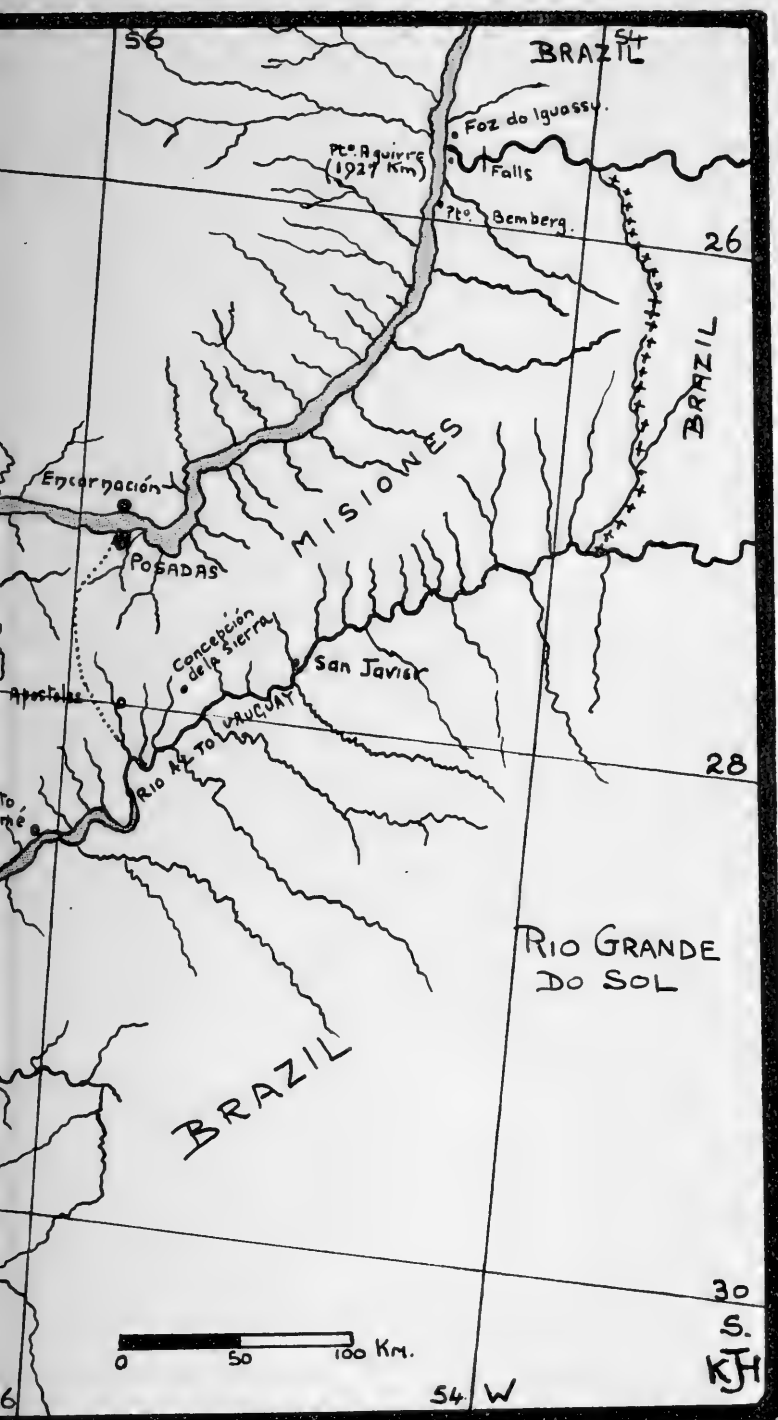
6. After emergence.

8. *Chrysopa septempunctata*.

generally found in batches, the number varying from 3 to 40. When first deposited the stalk is white and the egg a pale green, with a white buttonlike disk at the opposite end to the stalk. The eggs are ovoid in shape, the long axis being continuous with the stalk. The colour gradually changes and just before hatching the larva can be seen through the egg shell. The time between ovipositing and hatching is to some extent dependent upon temperature, but generally hatching takes place about the sixth day. The whole batch does not hatch at the same time but the emergence is spread over one or two days. The young larvae rest upon the egg shell for some hours before they crawl down the stalk and on to the leaf. One of the questions that will naturally arise upon looking at the ova is, what purpose does the egg stalk serve? The larva is very carnivorous, and it has been suggested that the stalks help to keep the young larvae apart; but this is questionable as in some of the other members of the family the eggs have a common foot stalk. Again, if the larvae are kept without food they will climb the stalks and feed upon the unhatched ova. If the ova are examined just before hatching takes place, the larva can be seen through the egg shell. The body is curled upon itself, so that the head is deflexed on the ventral surface of the abdomen, and the larva is enclosed in a nearly transparent skin. Between this skin and the shell is an egg burster, situated just in front of the head between the eyes. This egg burster is almost transparent and on its outer edge has a large tooth and below this a number of smaller teeth; the large tooth is forced through the egg shell and the smaller teeth enlarge the hole, acting like a saw. Immediately the shell is broken the larva bursts this skin and forces its way out, leaving the skin and egg burster partly in the shell. Most larvae remain on the egg shell some hours before descending to the leaf in search of food. They will feed upon any aphid that they find, even the woolly aphid of the apple. The larva was described by Dr. Withycombe and can be easily separated from others of the same family by means of the black markings on the head, which consist of a central black patch with two large patches on the sides of the head. The larva moults three times, besides the embryonic moult already described. The first moult takes place about eight days after hatching and the second in another eight days. The final moult in the Spring larvae takes place within the cocoon a few days after its construction, but in Autumn larvae it is delayed until the Spring.

When about to spin its cocoon the larva wanders about in search

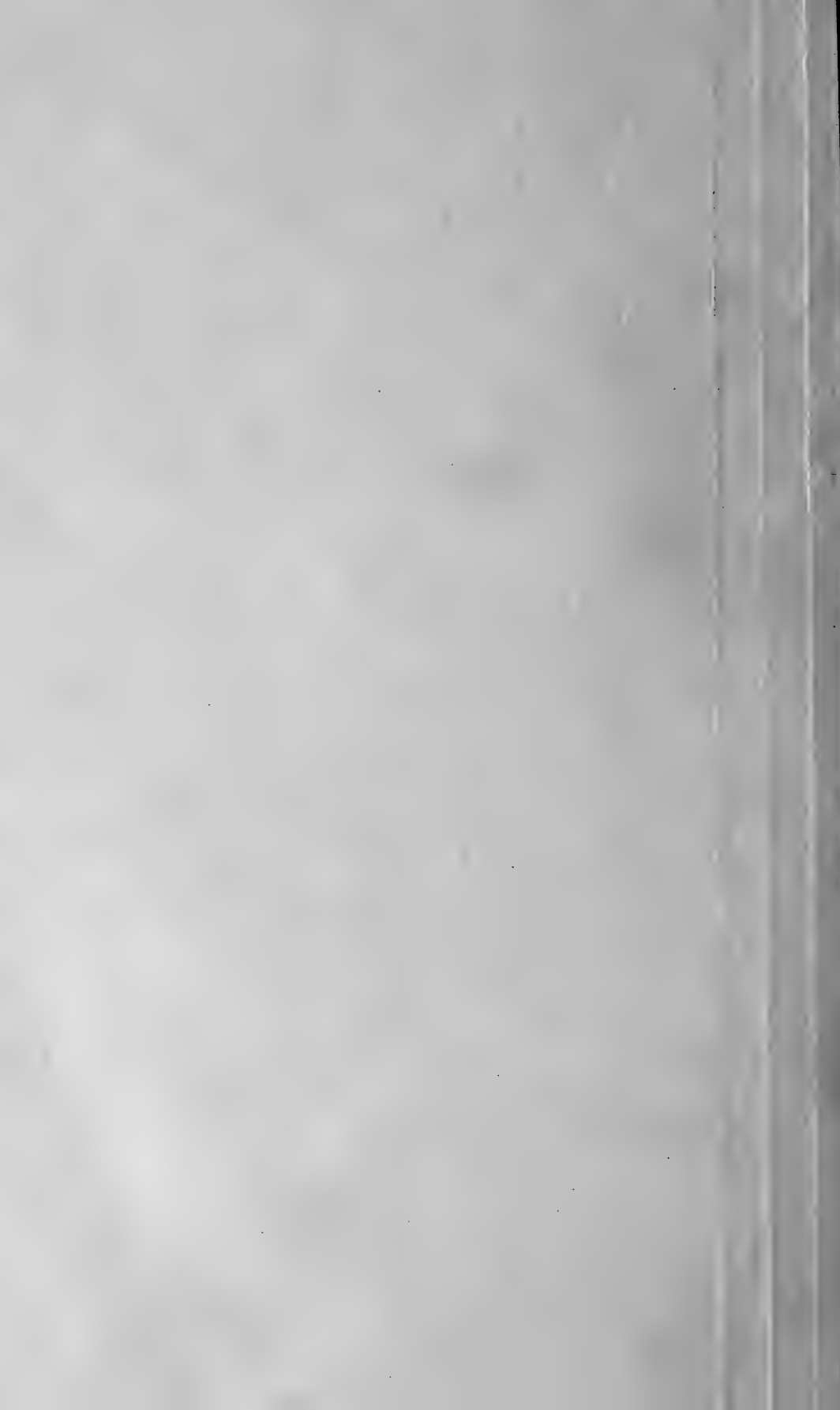
of a suitable place, which may be under loose bark, in a crevice, or in a folded leaf. There, the anus is used as a spinneret and is passed over the back attaching threads to all surfaces with which it comes in contact. After this loose thread work is done the cocoon proper is formed. This is a dense closely woven structure very small for the size of the larva. I have watched the beginning of the spinning of the cocoon, in order to see if I could discover any pattern in the spinning of the threads, but could find none. One of the reasons for this close observation was that it has been said that the pupa bites its way out of the cocoon, but if the cocoon is examined just after the larva has pupated, a cap, similar to that pushed off by the pupa, can easily be separated from the cocoon. I am of the opinion that the larva prepares this cap before it pupates. When the time of emergence comes the pupa pushes off the cap of the cocoon and crawls to a suitable place and there the thorax of the pupa splits and the imago crawls out. This takes place during the afternoon.

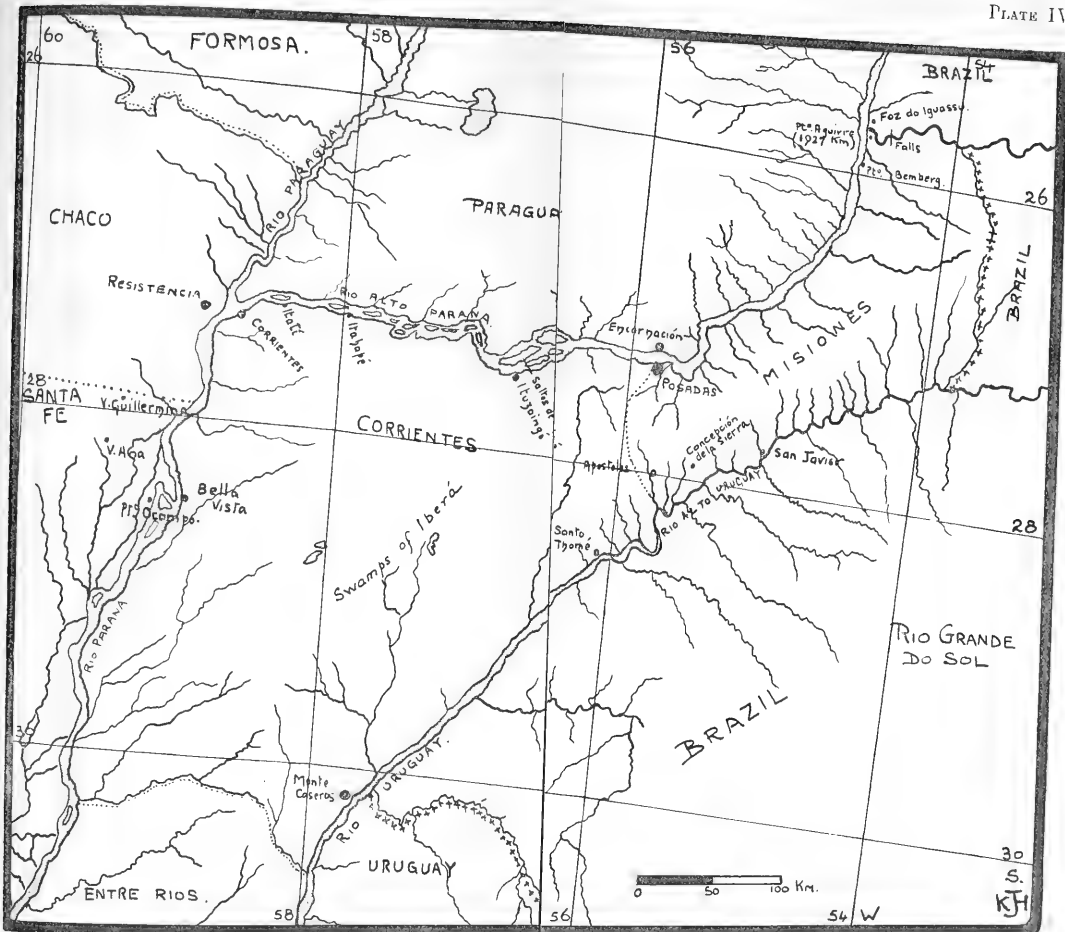


Del. K. J. Hayward.

DEALT WITH IN THIS PAPER.

to Pt. Aguirre is 1927 Km.)





SKETCH MAP, ILLUSTRATING AREA DEALT WITH IN THIS PAPER.

(NOTE:—The distance from Bs. As to Pt. Aguirre is 1927 Km.)

Del. K. J. Hayward.



Six Months Collecting along the Alto Parana, Argentina.

By KENNETH J. HAYWARD, F.R.E.S., F.R.G.S., F.Z.S.

Read 14th February, 1935.

In September, 1933, the "Octava Expedición Exploradora de la Zonas Invernales de la Langosta" of which I had been appointed Leader by the Argentine Ministry of Agriculture, having returned to its base and rendered its reports, I once more found myself among the ranks of the unemployed.

I had arranged to return to England for a visit after ten years in this country, but after nearly twenty years of sub-tropical life I did not fancy the idea of a winter there. To obtain temporary work was out of the question owing to the present economic situation. I therefore began to consider the question of an entomological collecting trip to tide me over till the following April or May. Even if I did not pay my way, I was likely to be less out of pocket than if I stayed in the City, and should certainly have a more exciting time of it.

This course of action having been decided on, three things remained to be done: to select the most advantageous route; to arrange what advance sales of material I could, and to make my preparations.

As quantity as well as quality was necessary if the trip were to be financially successful, the Territory of Misiones was indicated. A long outstanding invitation to revisit the haunts of the Chaco Santafecino, where I spent the first five years of my life out here, indicated a route via Santa Fé, and Resistencia in the Territory of the Chaco.

The first plan considered was to collect for about a fortnight in the Chaco Santafecino, where I could renew my acquaintance with the wild, lake-studded area East of the Rio Paranaminí, and the dense riverine woodland of the west bank of the Paraná. From here I proposed to go via Resistencia to the town of Corrientes, and then follow the railway down the West bank of the Paraná, cross over to the Rio Uruguay and follow this river up to Santo Thomé, where an attempt would be made to ascend the Alto Uruguay as far as San Javier, before going on to Posadas the Capital of Misiones. From Posadas right up the Alto Paraná to the Brazilian boundary at Puerto Aguirre, stopping off at several points on the way. The return journey was to include certain alternative stopping places,

and from Posadas the same route would be followed as far as Monte Caseros, to give an opportunity of collecting along the Uruguay, where the fauna is but little known, both in the spring and autumn. A short stay in Concordia to collect again at a wild spot just outside the town, where in 1932 I had taken several species of Lepidoptera and Coleoptera new to science, including a fine *Chiodes* (Lep. Hesp.), and had brought to light a *Pamphilina* previously not known south of Mexico. Thence direct by boat or train to Buenos Aires.

The great interest in this route lay in the exploration of the fauna of the Alto Uruguay, which is practically unknown; but after mature consideration of the heavy expenses that would be incurred over the circular route between Corrientes and Posadas and the fact that the Alto Uruguay could only be ascended in a specially chartered launch and only at very high river, owing to the numerous falls and rapids, this part of the trip was modified and it was decided to follow the Alto Paraná direct from Corrientes to Posadas, stopping off at certain points if considered advisable.

This latter route was adhered to with small variations on the northward journey, but the return journey was made direct from Posadas to Buenos Aires by river, owing to the already advanced season.

It is perhaps interesting to note that, within three months of the end of this trip I was to find myself travelling along the north bank of the Alto Uruguay on other business, and with the opportunity for spasmodic collecting between Apóstoles and San Javier, and only a few weeks later was appointed to the Concordia Experimental Station, which marches with the wild land above mentioned. My opinion that the fauna of the Alto Uruguay will well repay careful examination is, I think, borne out by the fact that, in an hour and a half's collecting in mid-winter in a wooded valley close to Concepción de la Sierra, I was able to take no less than 42 species of butterflies, many of them abundant.

Certain private collectors in the Argentine and the Museo Argentino de Ciencias Naturales, until recently known as the Museo Nacional de Historia Natural de Buenos Aires, promised to purchase material to certain monthly values, and further orders coming in later from abroad, I saw my expenses assured provided I could secure the necessary amount of material.

This fact caused my ideas to take definite shape, and I immediately set about my preparations, proposing to get away about the 15th of October and return on that same date in April. It is curious to note that these dates would have been exactly adhered to in spite of the necessity of continually altering my plans to fit circumstances and travelling facilities, but for the fact that the 15th October fell on a Sunday (the start being made the day following), although as a matter of fact no special effort was made to do so.

The task of preparing was no easy matter as I was going alone, nor had I any idea as to what facilities I should find in Misiones for adding to my technical equipment and supplies, should these at any time fail. Also the state of my finances required very careful consideration of every item, sixpence must not be spent where fivepence would suffice, and this fact must be borne in mind throughout this account, for had such strict economy not been necessary, more could have been achieved and the exploration extended.

Having travelled very considerably on the byeways of this country, I had learnt to realize that one of the most important points to be taken into consideration, was the method of packing the heavy luggage. For the previous Government trip, when we carried a vast amount of impedimenta, I had evolved a very satisfactory system. The bulk of the luggage was sent from point to point and we only carried with us such material as we should require for the section of the journey actually being undertaken and until we again made contact with the heavy baggage. This latter was drawn on daily before breaking camp and the actual day's supply of necessities packed in a couple of small cases, that were always at hand at a minute's notice. This method, apart from saving much worry and a considerable amount of expense, enabled us to travel with far greater freedom and with the minimum loss of time. Acting on this principle, I packed all my immediate requirements in the minimum space and forwarded the main supply from point to point.

A second vital point for my journey was to have the cases as far as possible of uniform size, easily opened, easily handled, and small enough to permit easy transport in a Ford car, by pack mules, in small rowing boats or even in the primitive native "piragua," which is simply a hollowed log.

Such a size case is found commercially in the kerosene box and in the cases used for packing cooking oils. The latter were selected and a hinged padlocked lid, strengthened as was the bottom with two wooden battens, was added, and they were completed by the addition of rope handles and a coat of grey paint, the total cost per case running to about two shillings. These cases apart from conforming to size had the advantage of being cheap and could be thrown away when empty, thus reducing the number of packages.

A suitcase for clothes and a large canvas bag for the hammock, blankets and camp kit, completed the impedimenta.

Later, during many days of close confinement to a leaking wooden hut where the windows were merely shuttered openings, I compiled a list of the material carried and of the space required for packing various types of insects. Had such a list been available before how much time could have been saved. As it was, my calculations were as nearly exact as they could be, and I only ran out of paper for papering Lepidoptera and tins for packing the insects in. These

latter proved the most difficult thing to obtain anywhere, impossible in Misiones.

By 16th October all was ready, the few last items had been collected, the heavy luggage despatched to Corrientes to await my arrival and I had received papers from the Museo Argentino de Ciencias Naturales giving my trip official status. I left that evening for Santa Fé, where I had a small item of business to carry out which, although it only took a few minutes, effectually prevented my taking a through combination owing to the late hour of arrival of the day train.

The following day proved to be abnormally hot, the temperature going up to 91·5° F., the forerunner of a week of even higher temperatures. My business finished, I strolled along the shores of the big inlet from the Paraná that borders the town, the laguna Satubal. Here were many thousands of decaying fish, the victims during September and October of some disease, which has never been satisfactorily explained. The stench was unpleasant, but, unequipped for collecting though I was, I persevered, as many small *Carabidae* and *Staphylinidae* and other small beetles were to be picked up. A very heavy wind suddenly blowing up, I took refuge in the beautiful sunken rose garden that lies at the end of the fine lake-front avenue and here collected a long series of rose-chafers (*Macrodactylus*), but curiously enough they were frequenting only the red roses, the white, yellow and pink varieties being completely free of them. *Papilio thoas*, L. and some *Tatochila* and *Euptychia* were the only butterflies on the wing, whilst a few moths were to be found on the tree trunks along the avenue. The State Railway are building a new bridge over this laguna a little to the North, and in sinking the caissons for the piers, have cut through a ten-foot stratum of petrified bones at each pier. Unfortunately little attention appears to be paid to this discovery and when I passed, the bones, many tons of them, were lying in a heap with a "help yourself if you like" sort of appearance. A close study of these remains, many of them of vast size, would probably throw much light on the pre-historic fauna of these regions.

At 11 p.m. I left for the North and at daybreak found myself once more in the red quebracho area, where one sees huge stacks of wood at every tiny station, train after train of logs for the tannin factories, and where the one item of conversation is "wood." Instead of the great sheets of surface water, lily-covered and with their flocks of the multicoloured jacana and an occasional duck or moorhen, there was an arid burnt up effect with many dead cattle everywhere, the aftermath of the great drought soon to be broken. All journeys, however interminable they may appear at the time, eventually end, and in the early afternoon we reached Tartagal, where many friends had come down to the station to see me, and one or two to continue the journey to Villa Ana.

At Villa Ana my host met me and after the short run in to the village along the Company's track and a few minutes rest, it appeared as though I had never left the place, the five intervening years forgotten. Only the unusual cleanliness of the village, the grown-up children and the saplings now large trees denoted any difference.

My stay in these parts had been calculated for a bare fortnight. The hospitality of my friends caused it to expand into a month, but I realized that it was not time lost as owing to the very late season, caused by the previous cold winter and the following drought, a somewhat later arrival in Misiones than at first planned would be advantageous.

Whilst here, I was able to revisit most of the spots I had frequented of old and found them remarkably little altered.

On the 20th I went to Villa Guillermina as the guest of the Manager for five days, but was unable to collect as the first days were taken up socially and on the Sunday torrential rains broke the drought. One very pleasant afternoon was spent on a visit to Puerto Piracuacito on the Rio Paraná. My previous trip down this line, which connects the Company's factory with its port, had been in search of duck, when the high river had caused much low-lying land to be flooded and the duck in their countless thousands had come in to feed. To-day the drought had caused almost all but the very largest of the numerous pools and lagunas, that fringe the river, to dry up, and only a few disconsolate jacana, a pair of grey ibis and a flock of bandurria ibis (*Molybdophanes caeruleus*) greeted the eye. In places the track was completely covered with long stretches of pink and red dwarf verbenas, and the banks with purple petunias and yellow iris. The curious belt of ceibo trees, that extends from near Reconquista in the south till near Resistencia in the north, was in full flower, a belt of blood-red trees.

The line that connects the village of Villa Ana with its port at Puerto Ocampo, usually holds untold interest for the naturalist, for after some twenty kilometres of forest track the remainder of the run down to the Paraná, crossing the small Amores and the larger Paranadini and Pindó, is lowlying, covered with patches of tangled forest and studded with many hundreds of lagunas, in some of which the magnificent Victoria lilies flourish, both *regia* and the pink *cruziana*. I looked forward to my first run over this line, but again the drought had played havoc, only a few small burrowing-owls gazed dreamily at us from their perches on the fence posts, and in the now almost dried up swamp beyond the Amores a few jacana and water hens sought their evening meal and a beautiful Martin pescador kingfisher (*Chloroceryle amazona*) sat watching a small pool of muddy water. I did however get a glimpse of the bird that is perhaps nearest to my heart, the water rail, as it ran hurriedly to the shelter of some bushes.

Around Villa Ana itself I found everything completely dried up and no vestige of water in any of the usually swampy areas. Even after the first rain a fierce wind that blew most days, making collecting no easy task, prevented much advance being made by the vegetation. My favourite spots that I had so often collected over had but the memories of better days to draw me to them. Occasionally a solitary *Catopsilia*, or a few worn *Phyciodes ithra*, Hew., or the ubiquitous *Terias deva*, Dbldy., showed themselves; a few Hemiptera fell into the beating tray, and a morning spent in a small open glade collecting from ants' nests produced some twenty myrmecophilous beetles or beetles with ant association.

However, the banks of the numerous railway tracks, that run out into the forest, produced much good material, chiefly in the sweeping net. These banks had the advantage of giving shelter to the insects when the wind blew strongly, and it was only along them that I ever got much material. Many fine *Curculionidae* of the rarer "coloured" species were taken, as well as *Heilipus* and *Lixus*. A very long series of a Lampyrid new to the fauna as also a single small Cerambycid, likewise not represented in our collections, were found on searching tall weeds, and when I left the track one morning for the adjacent forest I took the Erotylid *Brachysphaenus decempunctatus*, Dup., that I had not previously seen in these parts. It was in this piece of forest that I noted the extreme localization of certain beetles. In a small hollow covering an area of perhaps twenty square yards, normally full of water, there were hundreds of a small Chrysomelid whilst beyond this area not a single specimen could be found, nor did I come across this species again till I met it, under similar circumstances, far away in the north of Misiones.

Once I visited Puerto Ocampo for about an hour and was able to collect in the thick creeper-covered forest that borders the river and in the cane brakes. It was very early and few insects were on the wing after a cold night, but I swept up a good series of two species of *Hispidae* and some small *Buprestidae*. Mosquitos and a small gnat, that is called "gegéne" locally, were very active and were the first I had seen or felt on the trip.

I spent some four or five hours along the Rio Pindó on two separate days, and was delighted to still find traces of one of my old camps. On the first occasion I kept close to the stream hoping to see something of the wonderful birdlife that normally one finds along that river, but the lateness of the season or the drought seemed to have driven the birds away, for very few of my old favourites showed up. The river was extremely low and without current, merely a long string of shallow pools where great numbers of small yacaré (*Caiman sclerops*) were sunning themselves on the floating water-weeds, and plunged noisily into the stream as one approached. It was a threatening morning and after about a couple of hours

torrential rain caused me to seek shelter, but some two hundred insects had been collected and long series of water snails and other molluscs, which had been specially asked for by the Argentine Museum. On the second occasion better weather prevailed and a slightly longer time was available for collecting. This time I collected somewhat away from the stream where the vegetation did not seem to have suffered so much from the drought, and, after sweeping up some three hundred small beetles and *Hemiptera*, rounded off a quite satisfactory trip by collecting several hundred fresh water mussels and razor shells from the beach of a very shrunken lagoon. For the first time in my life I found the nest—if it deserves the name of nest—of the dormilon, (*Thermochalcis longirostris*), a “goat-sucker,” whose feathers were, and still are in some places, much prized as being a very potent love charm. The heavily brown-mottled pinkish-white eggs are laid on the bare ground without any form of previous preparation, apparently two per clutch.

On the 30th, after a start at dawn, we rode all day through the western forest, but although it was a magnificent calm sunny day only *Terias deva*, Dbldy. a few worn *Danaïs* and a single *Tatochila* were seen. But for the flushing of the huge Bragado duck or Oca de Brasil (*Alapochen jubata*) in a wide “picada”* and the finding of the glossy purple eggs of the little tinamous (*Nothura maculosa*, ssp.) the trip would have been uneventful.

There are very few of the larger animals left in these forests now that they are being exploited, but I had the pleasure of seeing one of the pretty little guasuncho deer at very close quarters one afternoon, and was glad I was without a firearm and not tempted to shoot it.

Social activities had prevented my collecting very seriously whilst in Villa Ana, but in spite of this and the extremely bad season, (I don't suppose ten species of butterflies in total were seen during my stay), I packed about 4500 insects before leaving.

On 16th November I finally tore myself away from my all too pleasant surroundings and proceeded to Resistencia. For the first time on this trip I began to notice the return to normal. The lagunas were at last beginning to fill and bird life began once more to take its place in the landscape.

A quick survey of the outskirts of Resistencia showed me that, in order to collect one must go far out, and as the fauna differs little, if at all, from that of the area I had just left, I decided to cross right away to Corrientes of which I expected much. I therefore took the ferry the afternoon of the day following my arrival in Resistencia and in a couple of hours was installed in that capital town.

Corrientes, which is possibly the cleanest of the larger Provincial towns that I know, though without the calm old-world charm of the

* Path or road cut through forest.

North-western towns, where the customs of Colonial days still peep through, has a small riverside park which, like the street, is very well lighted.

Here I repaired the first night and as a matter of fact on every subsequent night, much very valuable material resulting. It was curious to note the sudden and very abrupt changes in the insect visitants to the lights, and to the enhanced effect of one single lamp, whose frosted globe was slightly less opaque than the remaining twenty or thirty. This lamp invariably yielded fifty per cent. of my catch, though I could see no reason from a point of view of its position.

The first night yielded four forms of *Cicindelidae* including *Phaeoxantha limata* and a magnificent *Ph. bucephala*, also four forms of *Carabidae* of the genus *Galerita* (*ruficollis* and *gracilis* and two smaller insects) and a *Brachynus*. The surprise was a large Drilid-like beetle that I did not have the opportunity to classify and a medium sized Aphodiine was present in hundreds. The following night was dull and threatening and one would have expected great things at light, but apart from another of the Drilid-like beetle and a large Carabid, there appeared to be nothing but crickets at the lamps. On my way home I picked up one of the very few large *Belostomidae* that I was able to find. The temperature of the next day was still very high and the storm had not yet broken. The lamps were besieged by a large *Scarites* and I also took a brown Meloid, another *Phaeoxantha* and a small number of moths, chiefly a *Lasiocampid*. On the 20th, the night following, only three of the *Scarites* were seen and their place (as far as numbers went) was not taken by any other insect. There were however many beetles, notably numbers of a smallish black Curculionid, a Lampyrid (*Aspisoma* sp.), six different species of *Carabidae* of the *Galerita* type, two forms of *Cicindelidae* and the enormous Belostomid *Lethocerus annulipes*, that made as much noise rustling about amongst the vegetation of a flower bed as would a snake. The only moth of note was a completely green Noctuid. The nights of the 21st, 22nd, and 23rd, proved almost blank, 17 insects only were found in the park on the first named, mostly *Elateridae*, the pending storm was about to break when I visited the park on the 22nd, and only about a dozen insects were found and my last night, that following a day of storm, produced some score or so and nothing of note.

I had expected much from day collecting around Corrientes. I was sadly disappointed. There remains only one spot, where really good collecting is possible, and that is the woodland bordering the river to the East of the town. Here the woods are almost untouched virgin forest except for many brick burning places scattered along the muddy flats below the high ground. In spite of the excessive heat, I visited this area twice, but it proved a pure waste of time. I

have since had the opportunity of collecting here in midwinter with very different results, and I believe it must be a paradise for collectors in any normal summer.

There is an endless stretch of rough ground and woodland with many lagunas in the low ground that separates the main bank from what are undoubtedly islands in time of very high river. Flowers there were in plenty, but on my first visit there I employed almost every method known to collectors for seven hours and, if I remember rightly, for there is no note in my diary, the total catch was 67! Mosquitos swarmed and there were a few *Papilio polydamas*, L. common Danais, the commonest Theclas, and I caught a few of the Pierid *Appias drusilla*, Cr. that I had last seen in La Rioja. Dragging a stream I took a small Belostomid and a few *Hydrophilidae* and on a sauce tree I found a large larva, but I forget into what it eventually turned. Several pupae of a *Saturnia* failed eventually to produce anything and my only consolation was that I was able to sate my hunger—for I had taken no food with me—with handfuls of the delightful fruit of the small “ñangarpiri,” and the more acid fruit of the “ubajháy” which latter must however be taken in small doses.

My second visit gave a similar result. I spent some time on the more open upper ground where several species of cactus were growing and where I made the acquaintance of the “huapurú,” a small tree with dark chocolate coloured round fruit that grows in clusters from the trunk and branches. Two different Papilios, a pair of *Lycaenidae* and a few bees, wasps, flies and small beetles completed a very unsatisfactory bag for four hours searching with the temperature ranging over 100°. Many *Catopsilia cipris*, F. were on the wing.

The intervening days till the next boat sailed for Posadas were spent exploring the surroundings in the hope that some more favourable spot might be found, but everywhere the drought had made itself felt, a fact I was to have brought to my attention right up till the end of my trip. In view of the almost complete absence of insects, I decided to cut out my proposed stays at Itatí and Ituzaingó, and proceed direct into Misiones.

On 24th November I embarked soon after six on the Mihanovitch steamer “Iguazú,” and after waiting till nearly ten oclock for the combination with the southbound boat from Asunción and the northbound boat from Buenos Aires for Paraguay, we commenced the river passage to Posadas.

The river is still very wide but north of the steamer channel are many islands, some Argentine and the majority Paraguayan with the result one is sometimes passing through very narrow channels. For the first time I saw the towering fronds of the “tacuara” cane which at a distance appear like graceful ferns. Many butterflies could be seen along the shore, chiefly *Catopsilia* and *Pieridae*, the darker coloured species not showing up against the green background.

Hundreds of "yacaré" lay basking on the sandspits, many of them of goodly size. It is curious that but few are seen on the higher stretches of the river after Posadas is left behind. The river was abnormally low and the deeper channel winds like a snake. Close under one bank, we would suddenly swing right across to the far side and a few minutes later be back in mid stream again. On some of the islands monkeys were disporting themselves in the trees, apparently the black "tití" (*Nyctipithecus azarai*) and the smaller reddish "cay" (*Cebus* sp.). We stopped for a few moments in front of the villages of Paso de la Patria, Itatí and Yahapé to drop mails and passengers and during the night at Iba-ibaté. The lights of the ship attracted few insects, a *Belostoma*, a green Noctuid and a few specimens of *Selenis sueroidea*, Guen., are all that I have noted in my diary.

Very early the following day we went alongside the splendid floating stage at Ituzaingó and a few minutes afterwards commenced the tortuous ascent of the rapids of Apipé, the steamer being assisted by a powerful tug at the upper part. I ascended these rapids again in July of this year in a less powerful steamer and with the river even lower and we hitched on to a specially laid cable and pulled ourselves up with its aid.

Above the falls the stretches of water are much broader and the shore more distant and from the point of beauty and interest this stage cannot be compared with the reach below Ituzaingó.

At dusk the Paraguayan town of Encarnación became visible straight ahead and as the sun set we swung round the bend on which Posadas is built. The soft pink half-light of the setting sun on the harbour of Posadas with its small river steamers and many launches, flanked by the high "barranca,"* with its many tiny whitewashed wooden shanties nestling amongst luxuriant subtropical vegetation, reminds one of certain Mediterranean scenes, nor was I ever tired of watching the view over the harbour and the distant town of Encarnación at sundown, that one obtains from certain points along the high ground on which Posadas stands.

The day after my arrival, a Sunday, I occupied in clearing off correspondence, and later in exploring the pretty little town of Posadas, where one encounters everywhere the deep red soil that makes the Territory so fertile. Much wandering around during my stay has indicated that, there was really only one spot where good collecting is possible, owing to the great extent of occupied land that surrounds the town. By pure chance I stumbled on this place the first time I went out, and I cannot regret the time spent there, both at this period, on my return from the North and even on a more recent opportunity in midwinter.

It is a piece of low ground covered with forest and backed by much

* Bank.

rough land with many flowering bushes that lies just east of the port. Cattle graze there and it is a place for picnics, but much of it is still too overgrown to have been spoilt.

My first visit almost ended disastrously with a touch of sunstroke, but luckily a day's rest put me alright again and I realized that I was dealing with another type of climate from that to which I had been accustomed in the drier regions of the North West.

It was a delight to see again crowds of butterflies of every sort and to hear the continual low hum of insects. At least three species of *Catopsilia* were on the wing, *Papilio polydamas*, L., *P. perrebus*, Bdv., *P. thoas* ssp. *brasiliensis*, R. & J., and two other species, many *Hesperiidae* and *Theclae*, *Dynamine maeon*, Dnh., and *D. coenus*, F., at least three species of *Phyciodes*, *Chlorippe burmeisteri*, G. & S., and *C. seraphina*, Hb., *Euptoieta hortensta*, Blnch., which further North is replaced by *hegesia*, Cr., *Anaea morvus*, Fb., many *Terias deva*, Dbldy., Pierids chiefly *Tatochila*, clicking *Ageronia* and many others, many of which, whilst well known to me, I had never yet seen in nature. Along the river on flowering bushes I found not a few of the less common beetles and *Rutela liniola* was abundant.

At night the lights of the Plaza and the street lamps yielded surprisingly little and not a single Belostomid. Probably the now nearly full moon accounted in no little way for this fact.

At seven on the 30th I embarked on the yacht-like "Guayra," having decided to proceed direct to Puerto Bemberg and forego my stops at the intermediate ports, partly on account of expense and partly in view of the fact that, there appeared little likelihood of there being any great difference in the fauna. I have always found that collecting for a long period in any one place yields far better results than the same period spread over many, and a more characteristic collection of the fauna is possible. I was also somewhat scared by the signs everywhere evident that few insects were to be expected at least until the midsummer broods appeared, the spring emergences having almost completely failed.

The journey upstream, stopping at many small ports to drop mails and passengers for the small "yerbales," was a continual delight. The river is now much narrower, probably never exceeding a kilometre and becoming more confined as one advances North. One notes the difference in the energy of two peoples. On the Paraguayan side one sees only small clearings surrounding a dilapidated rancho or two, where sufficient maize and mandioca has been planted to carry the population over to the next crop, and where the only sign of industry is the pile of logs cut up for firewood for the river steamers. On the Argentine side every few kilometres are small or large "yerbales," where the *Ilex paraguayensis* is cultivated, from the dried and ground leaves of which the Argentine, rich and poor alike, makes the national drink, maté.

Many fine streams flow into the river from either side, but one

does not appreciate them from the steamer. About noon we passed near to the Sierras of Santa Ana, of no great height to one used to the foothills of the Andes, but of great botanical interest from what one could see from the river. It was on some high hills just past San Ignacio, that I saw palms growing on the high slopes, trees I had always associated with the desert, or with the level grass covered savannahs, that one encounters in the North of Entre Rios, in certain parts of the Chaco and in Formosa.

The cool breeze after a steaming day and the now full moon kept me on deck till late, but we were without lights as I was the only passenger and economy was the order of the day, hence no insects were taken, but a few were found early the next morning that had been attracted by the clusters of high power lamps switched on from time to time, when the boat hove to at the many small villages during the night.

Thanks to the fact that no fog fell during the night (a somewhat unusual occurrence on this river where a fog causes all navigation to cease), and to the fact that no cargo had to be landed anywhere, the trip proved all too rapid, and about eight the following morning I found myself on the beach at Puerto Bemberg. I did not know until my arrival, that this was a private estate owned lock, stock and barrel by a powerful firm in Buenos Aires, but I was welcomed by the sub-manager who immediately saw to my comfort and then proceeded to take me all around the "yerbales" in his car before going to the Office. The Manager, don Pablo Allain, assured me that I was "en su casa," and the courtesy and assistance I received from him and from his staff was far more than even the proverbial hospitality of Misiones had led me to expect. I was treated throughout more as a guest than as a wanderer, who had dropped in from the skies, and to such an extent did they go that I hesitated to thrust myself on them a second time on my return journey.

The estate is one of the largest "yerbales" in the country and already has some million and a half trees bearing, and I was privileged to learn much about yerba culture and preparation and, being interested in all that has to do with the agriculture of this country, I took full advantage of this opportunity.

I quickly fell into a routine here that I maintained till the end of my stay. As soon as the night mists had cleared off and the grasses and vegetation begun to dry, which was generally about eight oclock (sun time)* I commenced to collect, returning about eleven for lunch and to prepare the morning's catch. As soon as this was achieved I again went out, returning at dusk and immediately preparing the insects for transport. About nine p.m. I commenced collecting from the powerful lamps placed in certain parts of the village and continued till eleven or midnight when the power was cut off. As

* All times quoted in this paper have been reduced to sun time.

this evening catch sometimes amounted to from three to four hundred moths, an early rise was necessary to get them papered before it was time to sally forth again, and this meant turning out not later than five. It was sometimes possible to get to bed earlier if the night proved unproductive, but generally speaking five hours was all the sleep I could allow myself. The routine was sometimes altered when all day excursions were made, or when storms or dullness rendered collecting non-productive. At intervals an afternoon had to be taken off to pack the insects for forwarding to Buenos Aires, as the intense dampness of the climate made their drying out a difficulty, and there was the constant menace of mould. I am glad to say that throughout the trip I lost not a single insect from this cause, nor was I molested more than twice by the other great enemy of the travelling entomologist, the ubiquitous ant. On the two occasions when they put in an appearance I had left the morning's catch unprepared whilst I took a short rest, but in neither case was any damage done. Whilst the days were generally excessively hot and very damp, (on occasions I registered 95% relative humidity with the temperature over 100° F.) yet the nights were always cool, and on no occasion, save the few days spent in Posadas, did I sleep without a blanket.

Puerto Bemberg is a delightful little village and, but for the sub-tropical vegetation, one might almost imagine oneself in some English hamlet. The roads are magnificent and those through the village made beautiful by having in many places extensive flower beds alongside them where masses of zinnias and other flowers always attracted quantities of Papilios, Pierids and many of the larger *Nymphalidae*, to say nothing of the Hesperids. When one thinks that only eight years ago this place was impenetrable virgin forest, it seems hardly believable. Practically nowhere in northern Misiones does one find open land, at any rate on the Paraná litoral. I had always visualized forest clearing with much stump hauling. The *modus operandi* adopted in Misiones is much simpler. After the undergrowth has been cut down the valuable timber is cleared off the ground, following which the remainder of the forest is felled and left for several months to dry out. When ready for firing heavy rain is awaited, after which whilst the ground is still damp and thus not so liable to damage from severe carbonization, the tangled mass is set alight. Naturally much of the smaller timber escapes destruction. This is collected and with the unburnt branches which are cut away from the trunks, burnt separately. The trunks are then more or less lined up end to end and the crop sown amongst them and the stumps. If yerba is planted, such stumps as interfere with the lines of trees are pulled out, but otherwise all is left to rot, a process which occupies about six years, the rotting timber thus returning to the soil as a fertilizer. Only very few of the harder trees require more than this space of time to decay. The effect of these standing stumps in pasture is somewhat curious, in the

distance resembling a distant view of a war cemetery. The rotting stumps are a happy hunting ground for the coleopterist.

Collecting in the yerbales proved ineffective. Apart from stray insects and quantities of *Adelpha abia*, Hew. (whose larva feeds on the yerba as well as on other plants), and the beetles that attack the yerba, little results. The yerba in its cultivated state is very prone to many diseases and pests, and at the time I was at Bemberg the population had been called in to collect by hand from the plants the larvae of two Sphingids, an *Automeris* and a *Saturnia* at so much per kilo.

I was lucky in early discovering a long, somewhat overgrown picada that led to a little clearing that formed a veritable suntrap, having, in the valley below, a stream, whose banks were a crowded mass of flowers and which widened out into a somewhat muddy flat just before diving over a 20 foot fall, which heralded its disappearance into the virgin forest. This stream was always more or less sheltered and seldom failed to produce many insects, chiefly Lepidoptera, whilst on the muddy flats thousands of butterflies were wont to make a carpet of colour, the yellows of the Papilios and Catopsilias patterned with the golden brown of *Megalura peleus*, Sulz., the green *Victorina steneles*, L., and many hundreds of the brilliant blue Chlorippes, their females hardly distinguishable from the Adelphas. *Anartia roeselia*, Esch., was always present, for it loves the weeds of damp places, and little patches of *Anaeas cliques* together over some decaying morsel. Catagrammas, *Phyciodes*, *Dynamine*, Pierids, *Haematera pyramus*, Fb., Callicores, Lycaenids, Hesperids, *Dione* and even an occasional Brassolid made up a heterogeneous crowd that was almost a collection in itself. In the picada were many Satyrids and on a dull day, when only these were flying, I set out to see how many species there really were, *Taygetis yphthima*, Hb. and *T. tripuncta*, Weym., the beautiful golden eyed *Euptychia hygina*, Btlr. and six other Euptychias, besides the uncommonly marked brown and white *E. hesione*, Sulz. and *Pedaloides phanias*, Hew. All were flying in a short stretch of some two hundred yards or so!

At first I spent much time in this picada and by this stream from which much good material was collected, including several magnificent *Thecla*, more beautiful butterflies than two of which I have yet to see. On one occasion on a roadside garden near the entrance to this picada, I took no less than 10 of the 19 species of Papilio I took during my trip. It is perhaps hard to imagine a flower-bed where *Papilio rurik*, Esch., the rare *P. scamander*, Bdv., *P. polystichtus*, Btlr., *P. thoas* ssp. *brasiliensis*, R. & J. (immense specimens), *P. pirithous*, Bdv., *P. androgeus*, Cr., *P. laodocus*, Fb., *P. lamarchei*, Stdgr., *P. telesilaus*, Fldr. and *P. stenodesmus*, R. & J. were flying together with many *Nymphalidae*, Catopsilias and *Hesperiidae*. In the picada itself a great number of

beetles were always to be found during the day, the smaller ones generally by sweeping the rank herbage, but many of the better species on the trunks of the trees. No less than four species of the white-banded black *Erotilidae* came from these trees, but it was not for some time that I recognized that they were not all alike. Also hereabouts I took a short series of a red-striped *Naupactus* new to the fauna.

On the other side of the estate were extensive fruit plantations, where citrus, pineapples, bananas and other fruits were growing in quantities, and where many lesser known fruits had been planted experimentally. Both here and in the yerbales a green cover-crop of legumes had been planted to conserve as far as possible the dampness of the soil, and by sweeping over this crop, the net a few inches above the vegetation, many hundreds of small flies and ichneumons and other hymenopterons were always to be caught. A few kumquat (a small citrus fruit) were still in flower and attracted many *Syntomidae* and *Hesperiidae* and at least two of the latter new to our fauna were taken from one small tree. The *Syntomidae* are so very alike when taken in the field that I was very surprised on returning to Bs. Aires to find that I had in my collection more than fifty species. Had I been asked I should have put the number down at about a dozen. One must collect big quantities of everything, if it is not possible to examine the material immediately after capture, or there is always the likelihood that many new or little known species will be overlooked.

The high banks of the Paraná would be an ideal collecting ground, if more accessible, for they were then covered with flowers. I three times collected there and was lucky to escape injury. On the first occasion after some rather dangerous climbing I managed to enter a little valley running back from the river which was full of pink and yellow flowers. Once within it, however, I found myself confined to the bed of the stream that discharged itself into the bigger river, the banks being too precipitous and too tangled with vegetation to enable me to move over them. Otherwise I could have collected long series of interesting insects which were scarcer elsewhere. I got out at last by another route, stumbling for the last two hundred yards or so over a matted carpet of weeds and bushes some three feet above the ground, plunging through every few yards. I did not try this valley again but twice I followed the bank up nearly to the outlet of the Rio Uruguayí and got much good material, but the numerous hidden crevasses over which the weeds had grown and the general, but usually hidden roughness of the surface, caused falls to be frequent, and I decided it was too risky when there was so much other ground to collect over.

Along the sandy beach, from about eleven o'clock onwards till the late afternoon, huge patches of butterflies used to assemble, and they could be attracted to any special spot by watering the ground

with salt or sugared water. Sometimes many thousands of butterflies forming different groups would be visible at the same time, chiefly *Catopsilia* and *Papilio* with a sprinkling of many *Nymphalidae* and *Hesperiidae*. On certain days *Dynamine*, *Catagramma hydaspes*, Dry. and *Callicore candrena*, Gdt. would be present in enormous numbers. They sat with their proboscis dug into the damp sand, discharging every minute or so a drop of liquid from the anus. It is to be noted that the tipplers were always males; I failed ever to find a female amongst them. Mostly they were very democratic, but the *Catopsilias* used always to form themselves into groups, each species congregated together, though often the specific groups would be joined to form one patchwork coloured mass.

On 3rd December I saw my first *Morphos*, *M. aega*, Hb. and *M. achilles*, L., and wasted much time trying to catch the latter, which was soon to become almost a plague. I remember once in the Nevado de Famatina in La Rioja similarly wasting time over *Episcada hymenea*, Pritt., spending the whole morning catching some half a dozen whilst early the following day I swept over 50 into the net at one sweep under an ancient walnut tree. On the 11th *aega* was fully out and I spent the morning in a picada some 15 km. from Puerto Bemberg catching a series. It was lucky I did so as thereafter they quickly became worn and throughout my stay were always very scarce. In this same picada I took two specimens of *Dismorphia nemesis*, Latr., and the first specimens of the large purple Brassolid *Eriphanes reevesi*, Wstw., which though never thereafter very rare, was always to prove extremely hard to obtain in perfect condition.

In the village itself there was a large flowering tree, which was a great attraction, amongst other insects, to many *Hesperiidae*, *Syntomidae*, to *Dismorphia melite*, L., and a small race of *D. thermesia*, Gost., the blue and white Pericopid moth, *Estheme bicolor*, Cr. and thousands of the dark Lithosiid, *Apistosis judas*, Hb. Only when the sun was shining were the flowers open, and I was surprised at the length of time the tree continued to flower.

There was a considerable number of larvae to be found and at first I tried to study them, but single handed as I was, I found I really had no time to spare, and much as I wished to describe them, it proved quite out of the question. On the citrus were two curious Limacodid larvae that I shall possibly be able to procure this year for study, one apparently being the *Phobetron coras*, Hay. that I described some years ago from citrus and which also (or a very similar insect) feeds on *Ilex paraguayensis*, and on other wild bushes.

On 10th December I paid a visit to the very beautiful Rio Uruguayí at a point where, after running for some time over a wide flat bed of rocks, it suddenly narrows to form a forty foot fall into a deep circular basin with perpendicular walls, from which it rushes

down a deep gorge. It was an exceedingly warm day and a great deal of energy was wasted climbing about the rocky sides of this beautiful stream, where the vegetation, especially the ferns, was well worth examining, but little insect life was to be found. A very long narrow picada leads down to this point, in which a few beetles were picked up and the *Morpho aega*, Hb. was flying in quantities at midday. There is a species of tree that drips continually, whatever the dryness of the day, and under which there are generally many insects that are undoubtedly attracted by the dampness. I mention this in connection with this trip to the Uruguayí, since there were a great number of these trees along this picada. What the scientific reason for this continual rain of moisture drops is, I cannot say, though it is probably quite a well known fact.

A curious spider came under observation whilst I was in Bemberg and it was possible to study it for nearly three weeks. At sundown it commenced to build a web and thereafter till near the dawn collected the insects that entered the net, wrapping them up in its silken threads till they resembled cocoons more than anything else, and then removing them to the cranny in which it had its home. The curious point about this spider to me was that, the web had always disappeared by daylight. I was never able to watch the actual removal, but methods were adopted to guard against any external interference with the web, yet it was there in the early hours of the morning when I turned in after especially late nights after moths, and always cleared away when I rose at daylight. It is only to be presumed that the spider itself was responsible. Possibly this is a known trait of certain spiders—about which candidly I know very little,—but it struck me as strange. The spiders were eventually collected and sent to the Argentine Museum, where they are being at the moment studied.

A very fruitful hunting ground was a small damp corner of the forest which adjoined the peach plantation, and where the water from certain clear springs was collected in a series of covered tanks to form the water supply of the village. Over one of the older abandoned tanks, where the cover had been removed, many beautiful dragon-flies were always to be found, and in the dark bamboo clumps the Satyrids *Taygetis yphthima*, Hb. and *T. tripuncta*, Wym., and the big black and white *Tisiphone hercyna*, Hb., that in Puerto Aguirre was found daily on the tree trunks in the early morning. There were also many *Ageronia* here, *A. februa*, Hb. and *A. feronia*, L., that used to come and settle on my grey coat. The *Ageronia amphinome*, L. ssp. *aegina*, Fruh., which is normally common in these parts, proved extremely rare and in total during my trip I only saw nine or ten and all in ragged condition. The fruit attracted many species of the *Nymphalidae*, especially *Didonis biblis*, Fb., which was almost one of the commonest insects of the trip and of which in Puerto Aguirre I took an aberration in

which the right hand side was abnormal having the red maculate band pure white, the left hand normal. The rotting fruit was full of many species of *Nitidulidae* and certain *Staphylinidae* were also present. On some moss and lichen-covered palings here I found about a dozen cases of a tiny Psychid that appears to be new to science, the cases moss-covered so that only a very careful search revealed them. A single specimen was later found some miles away on a rotting tree.

I have said little about the night work. Dusking did not prove very effective, especially as the open spots were full of the weed "amor seco" (*Aster* sp.) whose seeds clogged the net and covered one's clothes so that many hours in total were lost picking them out one by one. Around the verandah of the Rest House were several lights and in the village one or two powerful ones, and nightly I visited these in rotation until there were no more moths of interest to be taken or till the power was cut off and I slipped into bed by candlelight. The enormous quantities of insects that came to light can well be imagined when of moths alone on moonless nights I often took over 500 selected specimens, knowing that if I took more I could never get them prepared for transport, for I had to fold the papers as I needed. In Puerto Aguirre I taught some children to fold them for me and they were delighted to earn the 1/8d. a thousand I paid them, probably they had never handled a whole peso of their own before. At the beginning the moonlight reduced the catches very seriously and later I found that it was hardly worth while visiting the lights around full moon time. But with the feeling that there might be something I stuck to it though with very poor results. At first the moth *Melipotis fasciolaris* was a nuisance owing to its great numbers and when these started to disappear a *Hylesia* sp. took their place, but being very sluggish did not interfere so much with the collecting. Undoubtedly the prize of this spell in Puerto Bemberg was an enormous *Dysdaemonia* sp., at least I suspect it to be of that genus. It is certainly new to the Argentine fauna and so far has not been identified as any known species. One of the prettiest moths, that came frequently to the lamps, was the somewhat "batis-like" *Eugraphia splendens*, that well deserves its name. There were many Sphingids but I do not think any will prove to be new, though I was told that one or two were doubtful. A single specimen of the curious "windowed" *Carnegia basirei*, Schs., rather intrigued me, and I took another large moth that I have not yet been able to place in its family, it is so totally different from any known Argentine moth and more reminiscent of certain rare African species. The giant Cossid, *Endoxyla xylotribus*, H.-S., was a regular and punctual visitor to the village lights, arriving always at a few minutes past eleven, never before. How many varieties of moths were taken in Puerto Bemberg I shall never know, but I should think five hundred species would be a conservative estimate, many of them new to science.

Probably one of the most startling morning's collecting was when, after some hours of almost complete blank, I stumbled on a single flowering bush of some *Compositae* that yielded no less than six *Hesperiidae* new to our fauna amongst the hundreds that were crowding every flower head.

On the 20th I was attacked by a touch of fever and had to take things easy for a couple of days but I had the pleasure of taking my first *Prepona*, and to my great surprise a Lucanid beetle, that I somehow did not associate with the climate and vegetation of Misiones.

On the 22nd I embarked on the "Guayra" for Puerto Aguirre, in the neighbourhood of which I was to spend the next twelve weeks.

Puerto Aguirre itself is on the Rio Iguazú about a mile from its junction with the Alto Paraná and the steamers turn up into this stream to land passengers for the falls, before proceeding to Foz de Iguassu which is the first Brazilian port on the river, navigation being possible as far as Puerto Mendez, after which the falls of Guayra prevent further progress. The area is now a military reserve with a small detachment of troops, from the Commandant of which I received every courtesy and assistance. The village itself is perched on the top of a terribly steep barranca up which a winding road leads to the flat top. There are possibly a dozen families there, leading a hand to mouth existence and surprisingly indolent even to the extent of buying from the colonists, mainly Germans, of the military colony of Foz de Iguassu across the river, the small amount of maize, mandioca and beans that form their staple diet, and on which I too was to subsist during my stay. It is at the mouth of the Iguazú that three countries meet, the Iguazú dividing Argentina and Brazil and the Alto Paraná these two countries from Paraguay.

Several years ago the timber from this area was exploited and the land then left to go its own way, with the result that a new forest has sprung up of soft wood trees that have little commercial value. This forest, where it existed, was more open and penetrable than the virgin forest and proved better hunting ground, and the fact that everywhere one found small picadas, albeit many of them very overgrown, rendered movement more easy and enabled more ground to be examined than would otherwise have been the case. There is a fine road cut directly through the forest, that leads to the Hotel at the falls which lies exactly 20 km. from the port, and from this road a branch runs to the now abandoned Puerto Iguazú where there is a large open weed-grown space with remnants of the fruit plantations that were sown, when the timber was being shipped from here. Near Puerto Iguazú the road turns east and continues for some forty kilometres into the centre where the wild yerba is being worked, thereafter continuing as a mule track to the far side of Misiones. These are the only roads, known as the Picada grande,

Picada Iguazú, and Picada al Centro respectively. The remainder of the picadas are little more than narrow forest rides, many not even being available for riding through. The barranca between the village and the river, certain portions of the forest behind the military encampment, the area around Puerto Iguazú and the surroundings of the falls themselves have been cleared and there are here and there small clearings where maize is being sown, especially at Km. 1 of the Picada Iguazú and at the end of a small branch road that runs parallel to this picada about half a kilometre nearer the river. Otherwise all is forest.

The chief collecting grounds were these picadas, the barranca above the river yielding little and being rather too much of a climb in the humid heat that generally prevailed. Puerto Iguazú proved disappointing in itself though the picada was rich in insects, and the open ground other than that around the falls generally produced very little. It was on the forest edge and in the rides themselves that the insects were to be found.

The intense dampness of Misiones, especially the nightly mists that thoroughly soak anything left outside, render efficient shelter imperative and through the courtesy of the military authorities I found myself installed in the end of what had, in the timber working days, been the principal store, a long wooden building with a small office partitioned off at one end in which I slung my hammock and where I worked. After a few storms I found out how to arrange my gear where the walls and roof did not leak, but the disadvantage of unglazed windows and the fact that the partitions did not reach the roof, thus causing a terrific draught when any wind was blowing, was apt to try one's temper almost to breaking point at times, when sorting and packing insects.

Christmas day was celebrated by the catching of three species of rare *Castnia*, two new to the fauna of the country and of the third of which only a single specimen exists in Argentine collections; of one of the former three specimens were taken.

My carbide lamp, from which I expected to reap a harvest, proved defective and used to blow up with great regularity once a night so that I eventually abandoned work with a sheet and collected from a light, which the Jefe of the Government wireless station, that is situated in Puerto Aguirre, kindly fixed up for me, the station having electric light. However, throughout my stay the moths proved very elusive, but many *Pyrilidae* and "micros" were taken except on bright moonlight nights. I also saw in life for the first time the well known lantern-fly, which many assure me they have seen with a light, very small but still luminescent. Whether this is really the case I cannot say. Another Fulgorid, nearly as big and much more beautiful, used occasionally to turn up and the giant Myrmileonid were taken for a few days towards the end of January. To show the difference between night work here and at Bemberg, I don't

think a total of more than 150 moths was ever reached, or if so only on very rare occasions, forty or fifty being the more usual number.

At first the main hunting-ground proved to be a long patch of a pink Composite that was growing alongside the Picada grande at the third kilometre stone. Here *Hesperiidae* simply swarmed till young hopping locusts came and ate away all the flowers. Day after day I collected from this patch and many of the new *Hesperiidae*, that I was able to take back, were the result of these excursions. Papilios also frequented this patch and the walk to and fro yielded a variety of *Lycaenidae* and *Riodinidae*, some new to the fauna, thousands of *Chlosyne saundersii*, D. & H., recently emerged, and a long series of a melanic form that will shortly be published as form *infuscata*, mihi. On these same flowers a great number of *Brenthidae* could be found by careful search. It is amazing what a quantity of species of this family exist in Misiones, in Puerto Aguirre alone I took over twenty species and for the most part in fairly considerable numbers. Whilst one of the most delightful sensations I know is the light touch of the butterflies that alight on one's face and hands to drink the perspiration, the attentions of hundreds of tiny black bees, small wasps and flies that literally smothered one whilst collecting from this patch of flowers was somewhat the reverse. Their occasional stings did not worry me for I am immune to the stings of most insects, but they got in the way and into one's eyes and were a general nuisance.

Since leaving Bemberg I had been troubled by a small infection above the knee that, whilst always inflamed and daily discharging a tiny quantity of pus, did not appear ever to come to anything. In fact it had the appearance and feel of a small cyst. About a week later I found it was the larva of the fly *Dermatobia hominis*, Say., called here the "ura." It must have placed its offspring there through a tear in my breeches whilst, I suppose, I was in Bemberg. In February I was again "parasitized," again on the upper part of the leg, and although it is rather a repulsive occurrence I was glad to have been able to study the insect at first hand. Most of the *Dermatobia* utilize other small flies to carry their eggs for them and this is supposed to happen also with *hominis*, but a very accurate observer of nature, who has passed some thirty years in the fly-belt, Don Pablo Allain, the Administrador of Puerto Bemberg, assures me that he and other observers in whom he has faith, have actually seen the fly—which he knows from having bred it,—alight for a split second on his hand, which after examination showed a minute larva entering one of the pores. The larva itself grows to be about an inch long and I believe the full cycle of its larval life is six months. It was too dangerous and too much of a nuisance to allow mine to remain more than about a fortnight in my leg after it was first recognized as such, for at first I mistook it for a small poisoned sore. The fly attacks cattle principally and cattle bred in

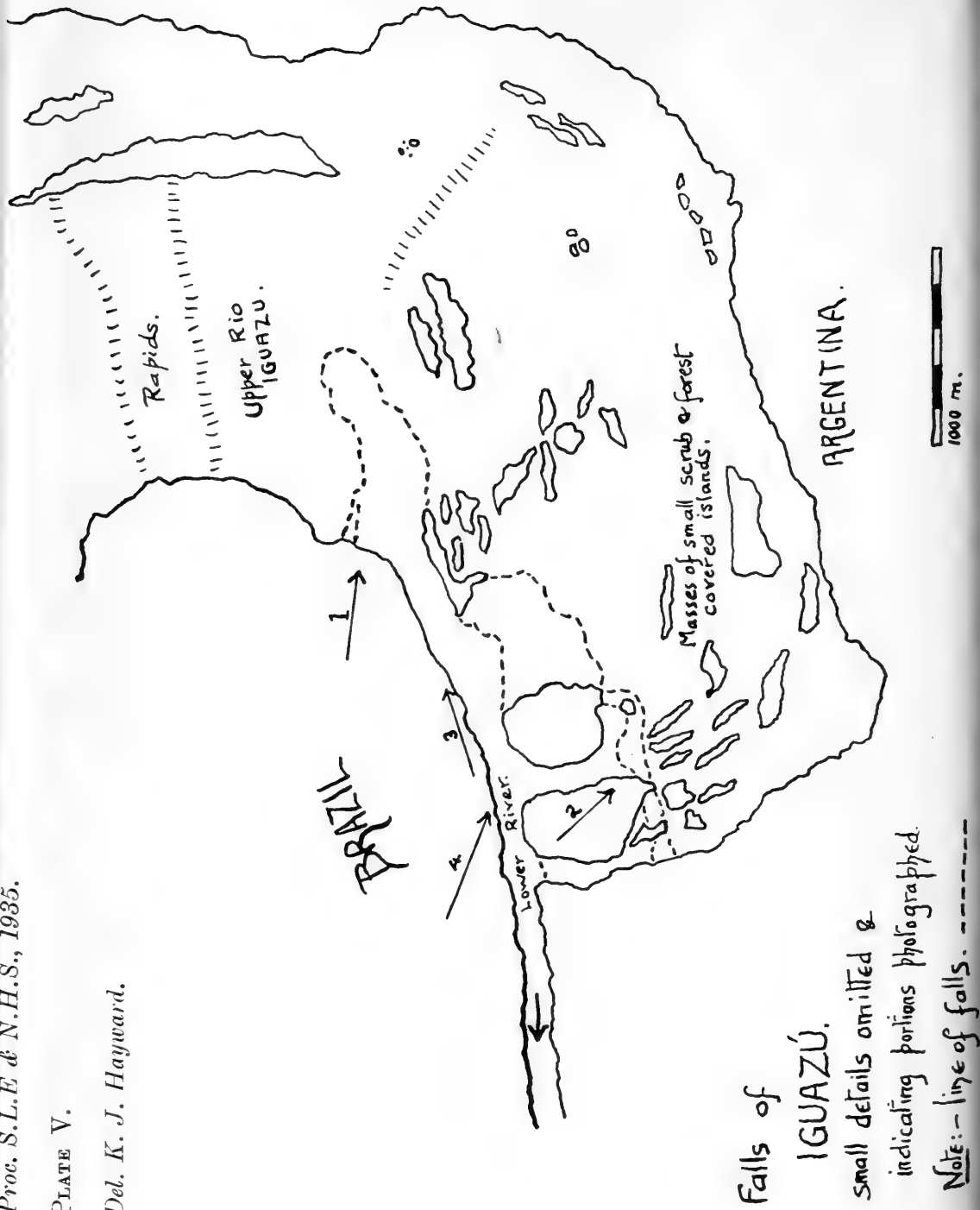
the fly-belt seem more or less immune from its worst effects, but suffer severely and the hides are greatly damaged. It rarely attacks horses and mules, but dogs are severe sufferers as well as many of the wild animals, even goats and sheep sometimes being attacked. It is supposed to attack man rarely, but this is far from being the case, as the natives are experts in taking out the worm and do not have to resort to medical aid, cases seldom get reported. I have personally seen Europeans working in the district with 8 and 11 respectively on their shoulders from working with a thin singlet. The worm gives little trouble on the whole but every eight or ten days the infection becomes more acute, the discharge of pus more pronounced and less watery than usual. At intervals, that may be of several hours or of several days, the insect appears to suck blood, as one has the sensation for about one or two minutes of a small bunch of needles being inserted and withdrawn many times in the infected spot. I extracted my second specimen almost immediately after this operation and found it full of blood. Generally they are white when taken out. Two methods of removal are in vogue, the oldest, that was known to the Indians long before Europeans arrived, is to cover the tiny air vent that surmounts the swelling with nicotine, the larva becoming dazed and permitting itself to be squeezed out some 24 hours or so after the nicotine has been applied. To squeeze a larva out whilst it is alive is a hopeless proposition owing to the nature of the tiny spines that ring it. The second way is to put a lump of fat over the opening and the larva will force its way up into it, presumably seeking air. I have never seen this method tried but am assured that it is equally effective. This fly extends from the north of the province of Corrientes in the Argentine through Paraguay and Brazil as far as Mexico. The Indians have long known it as the maggot of a fly; Francis La Condamine in his explorations of the Amazonian rivers round about 1780 was shown it by them, but Azara later stated that it was the larva of a large crepuscular and night-flying moth, a myth that still exists to a very great extent to-day. The adult fly is very rarely seen and in all the collections in Buenos Aires there is but a single ancient specimen. I personally never got it, and an offer of a peso to anyone who could bring me one resulted in about twenty species being handed in, every one "the real ura" but mainly tabanids and large hairy flies of any genus but *Dermatobia*. A man who had lived 45 years right in the forests told me he had never yet seen one. Some proof that its biology was known long before scientists discovered it, rests in the name given it by one of the most ancient tribes of Indians now fast disappearing, the Guayakis, who call it "Mberú-achó," which is literally "maggot of the fly." I hope one day to return to the study of this interesting insect.

There was a tree in the forest, whose real name I never quite discovered, as most people had a different name for it, some in Spanish,



PLATE V.

Del. K. J. Hayward.



Falls of
IGUAZÚ.

small details omitted &
indicating portions photographed.
Note: - line of falls. - - - - -

most in Guaraní, whilst some gave it a Portuguese name, but during the whole time I was in that area the sweet sap oozed out and was a certain attraction for many Lepidoptera and beetles and not a few other insects. There were two or three clumps of trees only, where this exudation was apparent, and attempts to cause it artificially met with no success. Hardly a day passed that I did not pay at least one visit to these trees. There were generally many great black moths in the early mornings and later the *Morpho* and *Prepona* were the chief visitants, with the *Ageronia* and certain Brassolids. One set of trees had the sap low down where the insects could be collected easily, but the best trees had the sap exudation very high up so that I kept near them two long poles on which to fix my net, the two poles lashed together giving me an eighteen foot handle, somewhat unwieldy, but proving remarkably effective. Here amongst other beetles I caught four specimens of the rare Cetoniid, *Inca clathratus*, and several of the fine Elaterid, *Hemirrhypus lineatus*, or a species very near, together with many *Cerambycidae* and an uncommon Lampyrid. The enormous *Callipogon armillatus* used to frequent one of these trees, always very high up, but with a thirty foot handle it was possible to scrape them off the trunks and quite a nice series resulted. The *Prepona* were possibly the most interesting insects that came to this sap as amongst the four species taken from time to time were half a dozen specimens of the rare *P. pylene*, Hew. ssp. *proschion*, Fruh., which was another new addition to the Argentine fauna as was the magnificent *Opsiphanes quiteria*, Cr. ssp. *philon*, Fruh., which was at first mistaken for a large specimen of *O. invirae*, Hb. ssp. *amplificatus*, Stich., which is the common *Opsiphanes* here. On one occasion I startled a large *Caligo beltrao*, Ill., from one of these patches, but a long search failed to put it up again. This was the only *Caligo* I saw, they are commoner on the eastern side of Misiones amongst the forests of the arauco pines.

Crepusculars were not common; or possibly they were, but as they generally frequent the dense tacuarals and other cane brakes, they were difficult to come by. A single torn specimen of the dark-loving *Penetes pamphanis*, Westw. turned up, but it is always rare. In the evenings I used to visit a small open patch of turf crossed by a small stream and where several picadas met. Occasionally the beautiful *Opsiphanes aorsa*, Gdt. would be flying here and on one occasion I watched a pair courting. They flew around one another in a close circle, certainly not more than six inches in diameter and without changing their position in the glade, and were so engrossed that they allowed me to capture them in my fingers. Collecting along these overgrown picadas at night or at dusk was always somewhat of a risk as in most cases there was a tiny footpath amongst the weeds along which snakes found an easier path than through the

undergrowth, and on one such evening I stepped on a small rattlesnake. The following day passing the same spot in the bright sunlight I looked out for this reptile and was so engrossed in searching the grasses at the side of the path that I narrowly missed repeating my performance, this time a large *Lachesis alternatus*. The greatest shock I experienced, however, was when, searching a tall flowering bush for beetles, I found myself looking into the eyes of some climbing snake that I had never previously seen. I saw really few snakes on the whole, the largest a nine foot grass snake that I met in short pasture at Puerto Bemberg, the smallest a beautiful little coral of some species of *Elaps*, that like myself was searching for moths below a light. At the falls I saw a very fine white marked black reptile (*Spilotes pullatus*) some six feet long; that was another whose acquaintance I had not previously made but probably it was harmless.

On 9th January I got a fleeting glance at the white *Morpho argentinus*, Fruh., that later proved much more common than usual. It flies very high, up and down the rides, and at first I spent much time trying to take a series of it, waiting patiently with a 12-foot handle on my net till one passed, but later I found it very common in the picada to Puerto Iguazú, where I several times took as many as eight or ten in an hour or so, and on one afternoon found no less than seven at dung on the road, six of which were perfect. It was a curious sight to see the compact masses of *Anaea morvus*, Fb., at dung, sometimes other *Anaea* would be present. They formed compact masses of fifty or sixty examples, crowded on fresh fallen dung, wing to wing, so that one could literally pick them up by the handful. On one occasion at the droppings of the jaguar for which they seemed to have a special liking, I counted no less than 252, whilst on the outskirts of the blue mass two *Morpho achilles*, L., were unsuccessfully doing their utmost to get a look in. For this reason the roads, over which any horse traffic passed, were always well worth a visit, as apart from those species mentioned, many *Nymphalidae* and the little blue *Lasaia agesilaus* Latr. ssp. *narses*, Stdgr., were generally to be found feeding. Beetles were not generally found under dung as this always disappeared during the night, being I suppose carried away by scarabs.

On the tree trunks one could almost always find splendid specimens of the *Tisiphone hercyna*, Hb., and in the darker parts of the forest *Taygetis tripuncta* Wym., and *T. yphthima*, Hb., and what a wonderful variety of underside colours and patterns this last species has, varying from almost uni-coloured to heavily marked, from light grey to the deepest of reddish browns. I was also lucky in finding three pairs in all of the largest fly I have ever seen (a Pantophthamid) I do not remember its name, the larva is woodboring, and the females measured across the wings some 65 mm. (not 65 cm. as one Buenos Aires paper is said to have reported it). *Cicadidae* were

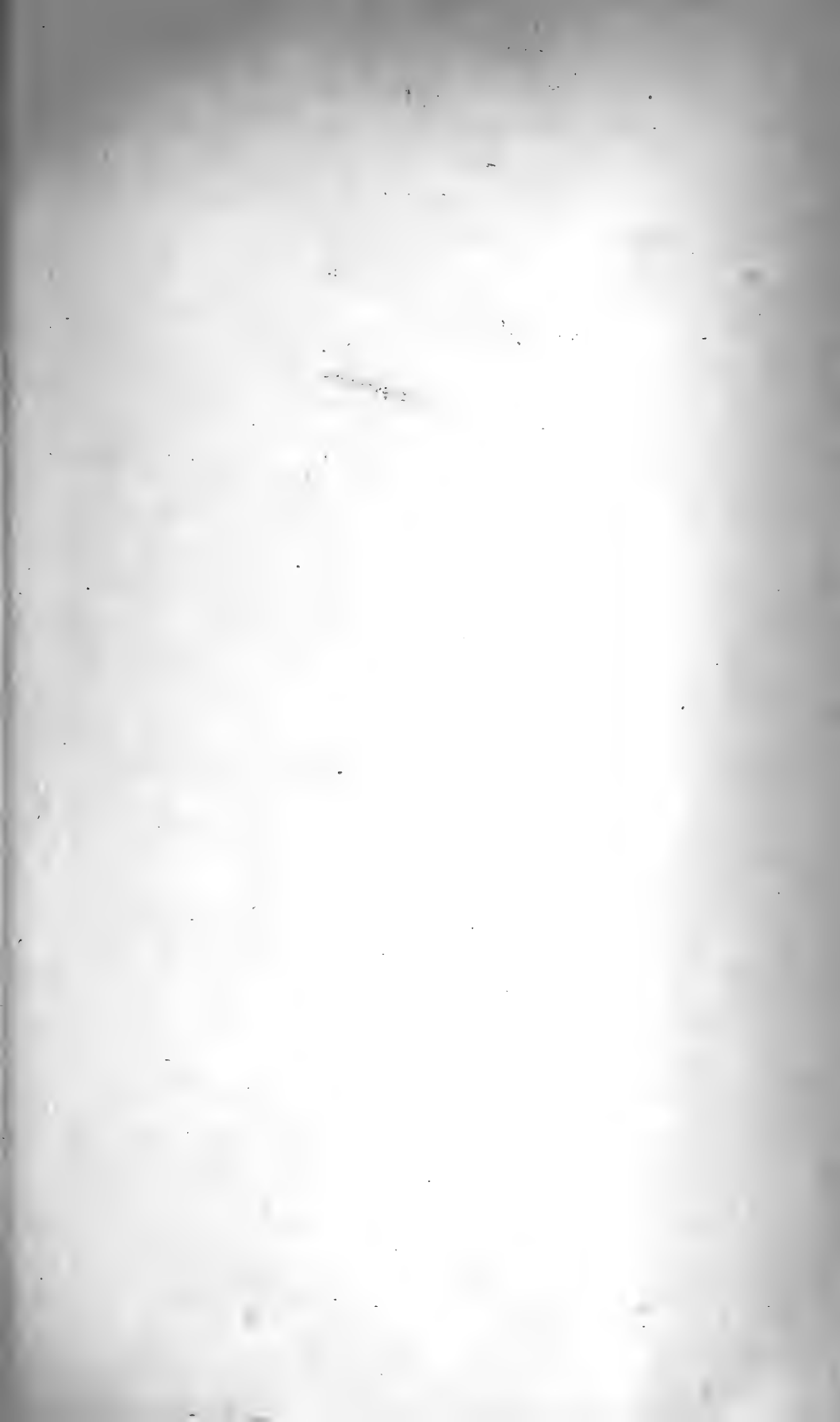




Photo: K. J. Hayward.

1. The main falls, Devil's throat (garganta del diablo) in centre; distance about 500 yards from camera. Only the top half of the falls are visible.
2. Falls on the Argentine side, the San Martin Fall to the left.

also plentiful on trunks and were less difficult to catch than when flying or on the small branches of trees and bushes.

As I have mentioned above, mosquitoes do not worry me much except for the noise they make at night, in fact I often slept without a net, but there were many species and I sometimes used to rest, sitting on a fallen tree, and baring my arm, catch them as they came to bite. Some idea of the vast numbers may be gathered from the fact that one dull wettish day I thus trapped nine species in about twenty minutes.

There were fallen trees, and where the bark had dried many insects were always to be found beneath it, as also under stones, but in the latter case unpleasant animals sometimes revealed themselves and it behoved one to go warily.

For a few days *Thecla*, especially the blue types, proved very plentiful in the picadas behind the military encampment, and many of the thirty two species that I took back to Buenos Aires came from here. *Syntomidae* were generally common at flowers and latterly great numbers of bees and wasps, but it may be added that most of the flowering bushes, at least the most attractive, were very thorny, and net bags were at a premium. *Meloidae*, for which I was especially searching, were always rare with the exception of the very common *Epicauta atomaria*, and the black *Lytta vidua* which I never found elsewhere than on bracken.

On 1st February I moved on to the Iguazú falls for five days, most of which were spent exploring and photographing.

To describe the falls would take many pages and then be incomplete, nor is this the place for such a description. Probably they are the most magnificent in the world, set as they are in the midst of virgin forest where, as one looks down on them from the high ground by the Hotel, one sees thousands of gray parrots and magnificent *Morphos* mingling with the green trees and ferns and splashes of colour where some plant is flowering. In all there are some forty falls, distinct at low river, united in one great whole at time of flood, stretching in a great curve for 2700 metres from the Brazilian bank of the Iguazú to a point nearly a mile further down on the Argentine side. At the main stream the falls are approximately 262 feet 9 inches in height for a width of some thousand metres, the remainder of the falls dropping some half this height on to a ledge, in some places only a few yards wide, in others a wide plateau, from which ledge they again plunge down into the valley. The maximum H.P. that could be generated has been calculated at 6,985,170 during time of flood with an average output for all conditions of one and a quarter millions. May the day when these glorious falls are harnessed be far distant. The five days I spent prowling about amongst this wonder of nature will always remain graven on my mind, and when I found myself once more in the quiet of the Aguirre forests it was at first with the feeling of something lost.

On the paths below the falls a few specimens of the Lymantriid, *Floria moeonia*, and many specimens of the beautiful *Papilio nephalion*, Gdt., were to be found and I was able to photograph the tiered nest of a small wasp, the specimens sent for identification being lost, which measured but an inch or two under four feet long and some two feet high. At night many moths came to the hotel lights and I remained collecting till nearly two a.m. each night, rising again at daybreak.

As February progressed, so did the number and variety of insects increase, and a great number of larvae were to be found with but little searching. Heavy and continuous rains fell again about the middle of the month and one disastrous week failed to produce more than 400 insects. I spent many of these wet days, when the rain was not too heavy, fishing in the Iguazú. The Dorado fishing in the Alto Paraná in certain seasons is magnificent, two friends in Puerto Bemberg taking from one to seven fish every evening during December till the river started to rise, fish of from five to nearly forty pounds. Personally I had to content myself with the primitive native tackle, but an occasional fish made a change from the eternal mandioca, beans and maize that formed my staple diet. It was a wonderful sight one day to see the hundreds of dorado jumping, at a point where the clear waters of the Iguazú mingled with the brown muddy waters of the Paraná.

Towards the end of this month flocks of swallows assembled on the tall wireless masts every morning, but in which direction they were migrating I never noticed, presumably towards the warmer north.

One of the prettiest walks was along the picada towards Puerto Iguazú, turning off towards the centre. It was a longish walk and before returning one had covered some twenty odd kilometres, but there was a magnificent stream in the valley, reminiscent of Badgeworthy water in Devon, and where there were always plenty of insects, and where one morning I startled a tapir, the anta, probably *Tapirus americanus*. About this time too, I had the pleasure of twice meeting the so called "tigre," the jaguar, *Felis onca* of which the inhabitants were at the time going in mortal dread as the one or two specimens present had commenced to raid the isolated ranchos at night and carry off the dogs. On the whole I saw few of the larger animals, once I caught a glimpse of the "gato montés" or forest cat the *Felis mitis*, and occasionally one saw a stray fox or one of the coatis.

On 10th March whilst searching for the whitish Rodinid *Diophtalma mathata*, Hew. I saw my only specimen of the big *Dynastor darius*, Fb. ssp. *mardonius*, Fruh. that always gives me a thrill, why I do not know, unless it is because of some memory of the happy days I spent in the Chaco Santafecino where I first came across it.





Photo: K. J. Hayward.

3. Looking up the trough of the lower Iguazú towards the head falls, which are about half a mile distant (from the Brazilian side).

A most amazing thing was the great hospitality of even the poorest. One came frequently to small hard-won clearings where a few melons and some maize were growing around a small rancho, and as I generally stopped to ask permission to wander around I came to know most of the inhabitants. Rarely was I allowed to pass on without stopping to partake of the hospitable maté, and one old lady, a Paraguayan of nearly eighty years, always sent a boy out to me complete with maté and kettle every time she saw me working anywhere near her house, a somewhat embarrassing situation if one was in a hurry, as maté drinking wastes more time in this country and Brazil than can be calculated. I was however to find out on this trip the great value of this drink, as after a long day in the damp heat, sweating continuously, I used to arrive back really exhausted and fit for nothing. Then I took to having a maté as soon as I got in and found what a great difference it made to me.

During certain wet days I worked out a scale on which I could evaluate the entomological worth of each day. December proved 85% perfect weather, which was all one could expect, but January with rain falling in greater or less quantity on 22 days and with only 6 days that could be really considered 100% fine, fell to 42% perfect, and February to 36%, rain falling on 22 days on six of which no sort of collecting could be indulged in and with nine consecutive days on which the sun failed to appear, only three days being fully sunshiny. March, with only six days interfered with by rain, rose to 80% again, and with the enormously increased insect life, once more picking up after the disastrous previous winter and the drought, proved with the early days of April the best part of the whole trip. The round figures give some idea of the state of things in January and February, for in three weeks collecting in Puerto Bemberg in December nearly 10,000 insects were packed and 14,000 between March 13th and April 8th, whilst the months of January and February scarcely reached 6,000 per month.

On the evening of 12th March, with the sun setting a brilliant red, I dropped down stream once more to Bemberg in response to a cordial invitation to visit my friends again.

I was amazed at the sudden change in the numbers of insects. Where there had been few before there were now hundreds. *Syntomidae* were plentiful everywhere and there were many *Riodinidae* that I had never previously seen on the wing. The small Dasytid beetle (*Astylus variegatus*) was a veritable plague and you couldn't catch an insect from flowers without getting several of these in the net at the same time, and although I must have examined thousands I found no variation.

The figs were now ripe and attracting huge numbers of wasps and flies and a few of the commoner *Cerambycidae*, *Trachyderes striatus* and many others, and sweeping above the green cover crop yielded small *Diptera* and ichneumons in enormous numbers.

Insects at light kept me busy nightly till the last minute and many rare species were taken and series completed of those that had proved scarce in the early summer. In all I was averaging some 500 insects a day, and as on some days this number was very reduced, I was kept pretty busy on the whole getting the material into its packing cases. There were numerous specimens of the *Pericopinae*; *Pericopis cruenta*, Hb., to be found by day on certain flowering plants and it was interesting to observe the action of this insect when held between the fingers. It appears to have the power to exude a long thin stream of bubbles of a bitter ochreous-yellow liquid from a point just behind the prothorax, dorsally. It is amazing the length of this stream, the emergence of which coincides with the pulsing of the abdomen. Specimens were sent to Dr. Eltringham, who very kindly examined the insect for any special gland, but such does not seem to be present. Further observation is necessary to clear up the method and reason for this action.

A Pyraustid moth, very similar to *Margaronia hyalinata*, swarmed everywhere at light till the roof-boards under the verandah of the rest-house just around the lights completely disappeared from view. They were like a small army of aeroplanes about to take off.

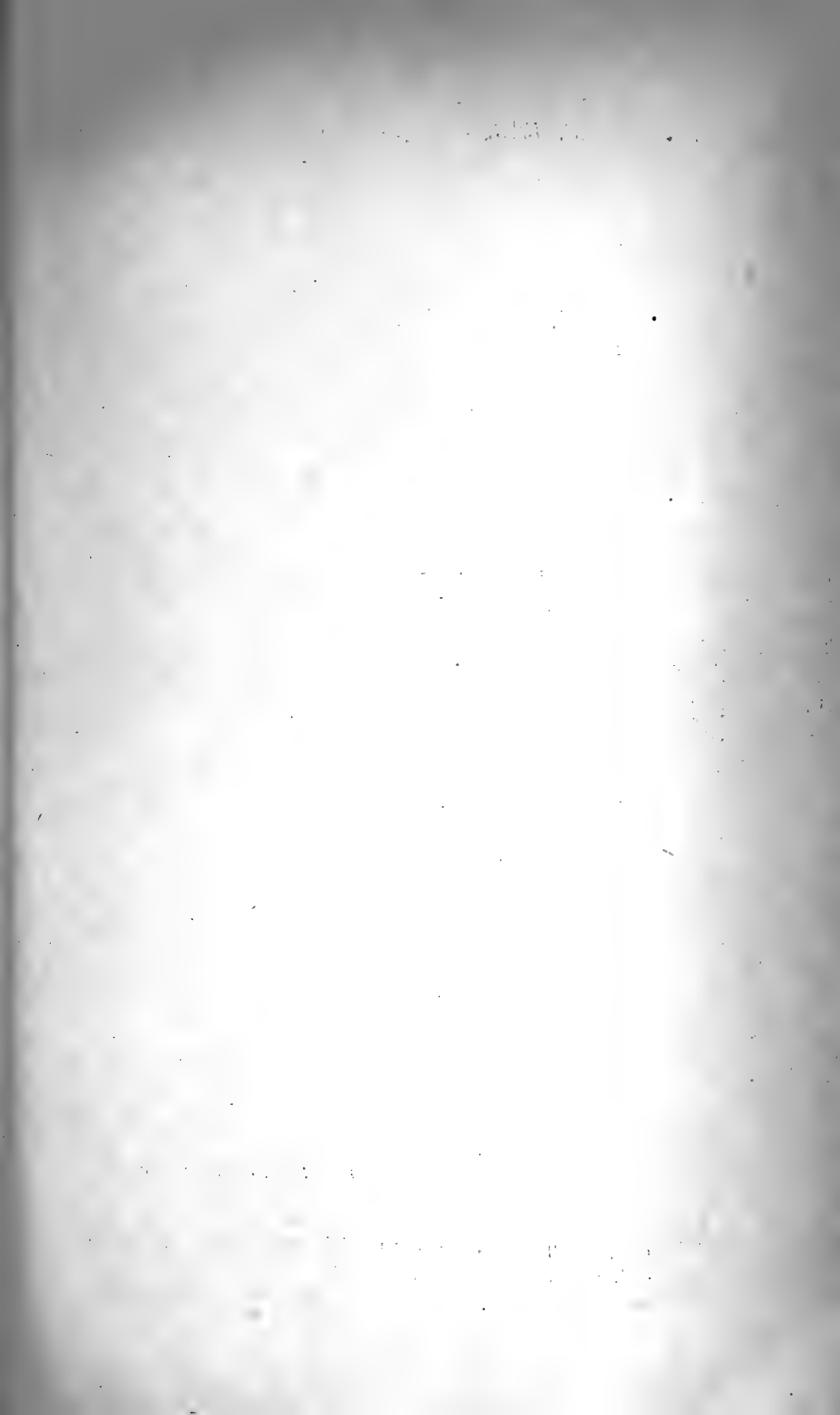
On the 30th I tried to cut straight across through the forest some two kilometres to the Rio Uruguayi. After nearly two hours struggle, much of the time literally crawling, I did eventually reach it, but I found my way back by a path. There is no fun in having the clothes torn off one's back with the temperature up in the skies and practically without taking a single insect worth while.

About the end of the month numerous species of the transparent Danaids were coming out, *Ituna ilione*, Cr., *Mechanitis elisa*, Guér. and forms of *M. nessaea*, Hb., unidentified forms of *Ceratina eupompe*, H.-G., *Dircenna dero*, Hb., the common *Episcada hymenaea* Prtw. and the small Pierid-like *Aeria olena*, Wym., and it was possible to take long series of all except the latter.

On 1st April it rained heavily all day, clearing up late in the evening and I was surprised to find the walls of my house (which were whitewashed) covered with the Pyraustid when I returned late in the evening, although there was no light showing nor any moon to shine on the wall.

A pupa of *Pyrameis carye*, Hb. was noted one day jerking itself backwards and forwards as it hung from a dried weed, though it did not emerge till fully a week later. The same day I was pleased to take a series of the first female *Dynamine artemisia* F., I had ever seen alive, and in the mud at the side of a stream found hundreds of garapatas (*Boophilus microplus*), which had apparently fallen from cattle that had come to drink. I had not before seen them in like places though they are common enough in the herbage in the "garapata zones."

My trip had by now nearly run its course, and on the night of



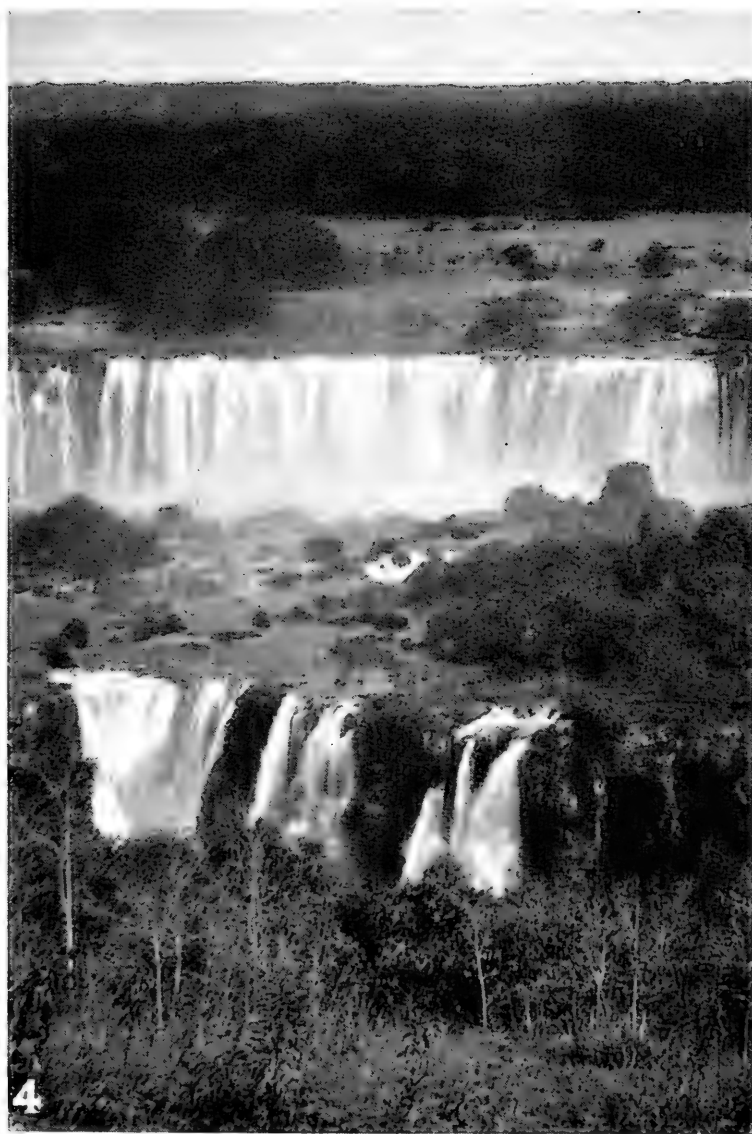


Photo: K. J. Hayward.

4. "The Three Musqueteers," seen from high ground on the Brazilian side showing the forest setting of the Falls in general.

the 9th I commenced the journey down to Posadas which was not reached till the morning of the 11th, as we stopped at many ports to load yerba or fruit. Here I had one day which I spent in the spot already mentioned, finding far fewer insects than on my way up but certain beetles that I had not previously encountered. That night I slept aboard the "Ituzaingó" and we left at about eight the following morning for Corrientes, passing in daylight that part of the river which on the trip up we had passed by night. It was bitterly cold and very few yacaré were to be seen, though many monkeys watched us from the tops of some dead trees on one of the islands.

The following morning I transshipped at Corrientes to the magnificent "Ciudad de Corrientes," one of the finest riverboats afloat, and after rather more than two days arrived once more in Buenos Aires.

Financially the trip had not been a failure and in spite of the adverse season and the prevailing wet weather in January and February and the failure of night work in general at Puerto Aguirre some 42,000* insects were collected of which about 15,500 were Lepidoptera. The results as a whole will never be available, but it is some indication of the value of the material to say that no less than 80 butterflies were added to the Breyer collection, the most complete collection of Argentine Lepidoptera in existence, that were not previously represented, most of them *Riodinidae*, *Lycaenidae* and *Hesperiidae* and of which some 45 of the latter and 16 of the former were new to the fauna, and probably nearly twenty of the *Lycaenidae*, which are still not worked out. I have no idea of the number of moths added to the country's list, but judging by some 2,000 that I prepared for Don Alberto Breyer immediately on my return, that number will be very great.

Whether I shall ever again have such an opportunity I do not know, as my work now lies along the path of economic entomology, but whatever happens, I have a memory that cannot be taken away of many happy months spent with nature in the magnificent setting of the virgin forests of Misiones.

* Some 20,000 found a home in the Museo Argentino de Ciencias Naturales, 8,000 in the British Museum, the remainder in private collections in this country, the United Kingdom and the States.

NOTE:—On p. 65 line 4 from the bottom read *Ilex paraguariensis*, for *I. paraguayensis*.

Some Breeding Experiments with *Hemerophila abruptaria*, Thunb.

By G. A. BRETT.—*Read 14th March, 1935.*

THE EXPERIMENTS.

This series of experiments was started more or less by accident.

On 13th May, 1933, my brother, Mr. P. Brett, caught a pair of *H. abruptaria*, Thunb. in coition on a fence at Cricklewood, London, N.W.2. The female was of the normal form, and the male was the melanic var. *fuscata*, Tutt, or *brunneata*, Tutt.

We kept the female for eggs, and she deposited 109, of which 68 hatched, and 15 larvae eventually pupated.

All the moths bred in the course of these experiments have come from this original pair. No outside stock has been introduced at any time.

The cages and methods used may be of some interest. The cages are made from old photographic half-plates with the film cleaned off, and stuck together along their long edges with the gummed strip paper used in some shops for doing up parcels. The bottoms are made of two pieces of three-ply wood nailed together and painted or varnished. (A cellulose paint was found to be the best finish.) One piece fits inside the glass, and the other is large enough for the glass to stand on. There are two holes bored in the bottom, through which the stalks of the food plant project. The whole cage is stood on a jam pot full of water, so that the food plant keeps fresh.

Three different sorts of top have been used for the cages. One is of perforated zinc, either bent over at the edges, or with wooden edges, one of copper gauze with wooden edges, and one of muslin on a wire frame. The last is the best, as it prevents the escape of even first stage larvae, and is easy to make, besides being cheap and strong. It is, however, rather light, and needs an elastic band around the cage to prevent the risk of its being knocked off or displaced.

These cages will satisfactorily accommodate about 30 full grown larvae. Larger cages have also been used, made in the same way from photographic whole plates, and these are very satisfactory. Each will accommodate about 70 full grown larvae.

When empty, these cages can be folded up and packed in a small space, and so are easily portable.

Experiments have been carried out on two different lines. One was to find out the effect, if any, of breeding the insects at different degrees of humidity, and the other was genetic in character. The humidity experiment will be dealt with first, as it is the simpler.

The method used was to divide each brood into three equal sections. One of these was kept as dry as possible, one as wet as

possible, and the third was not controlled. The chief difficulty was to keep the humidity anything like constant, especially in the dry cages. It was fairly easy to keep up a high humidity in the wet cages, but it was extremely difficult to keep the humidity down in the dry cages. After several unsuccessful attempts, the following method was adopted.

The tops of the cages were covered with Cellophane stuck down with Durofix, and the bottoms were sealed with Plasticine, thus making them airtight. In one corner of the wooden bottom a hole was bored, through which was passed a glass tube with a piece of muslin over the end to prevent the larvae from escaping. In the diagonally opposite corner some holes were pricked in the cellophane, and a current of air was passed in through the tube and escaped through the holes in the cellophane. For the wet cages the air was first passed over wet pumice, and for the dry ones, over Calcium Chloride. The blowing apparatus is described and figured in the Appendix.

This method worked fairly well. The humidity in the dry cages was kept fairly well below normal, and that in the wet cages above normal, but it did not stay anything like constant. The difference, however, was sufficient to show up any possible changes in colour due to the difference in humidity. It was not found possible to take a reading in every cage every day, but fairly frequent readings were taken, and the apparatus was examined daily to see that it was working properly. Paper hygrometers were used for taking the readings, and the results are given in Table I. They can, I think, be taken as a fair sample of the conditions in the cages. The average reading given is the average of the readings in the cage concerned less the maximum and minimum.

The blowing apparatus was used for controlling humidity between 19th March and 7th August, 1934. Hygrometer readings were taken between 28th March and 18th June. Before 28th March no hygrometers were standardized, and after 18th June I was away from College except for occasional days and did not have time to take hygrometer readings. In my absence the lab. assistant, in whose charge the cages were, renewed the Calcium Chloride, and fed the larvae, but did not take readings.

On 7th August the cages were taken down to Sussex, and after this date the humidity was not controlled. Thus the insects were kept under controlled conditions of humidity from the date of hatching until 7th August, and 112 moths out of a total of 187 had emerged by that date.

The air was led through a tube to the cages, the junctions being made with glass T pieces, and the several broods were arranged along a bench in two rows of cages, each row consisting of alternate wet and dry cages. By this means it was arranged that an equal number of the larvae being kept dry and moist were nearer a

window, in the brighter light, the other half of each group being farther from the window. In any one brood, one group of larvae was kept entirely in the brighter light, and the other group in the duller, but this was not considered to matter, as the sum of all the broods was being taken for the result.

The uncontrolled sections of the broods were kept in cages with the ordinary muslin tops, and were placed on either side of the rows of controlled cages, alternately nearer to, and farther from the window.

The result of this experiment is given in Table II. It will be seen that the types did not vary in intensity of wing colour, but that the melanics did. The latter were divisible into two distinct groups (light and dark), with no intermediates. The 'lights' were very much fewer in number than the 'darks,' and from their distribution it is obvious that the intensity of wing colour is not in any way correlated with the humidity at which they are reared. It will be noted that of the 27 'light' melanics appearing, 20 were in various sections of Brood $F_3 6$. It should also be mentioned that of these 27, 22 were females, the five males occurring three in the wet section and one in the dry section of Brood $F_3 6$, and one in the dry section of Brood $F_3 14$.

From these results it seems certain that the intensity of wing colour was not affected by the relative humidity at which the insects were reared, and it seems likely that the two forms of the melanic are due to two different genetic factors.

GENETIC EXPERIMENTS.

Concurrently with these humidity experiments, various genetic experiments were carried on. The pairings used for the humidity experiments were of various types, and the breeding results are shown in Table III. It will be seen that the ratios are more or less consistent with the view that the factor for melanism is a Mendelian dominant of some sort, but apparently not quite a simple one. Two forms of the melanic have turned up. One is much paler than the other, and occurs in smaller numbers, but as yet insufficient numbers of it have appeared to determine what is its genetic relation with the other forms. In the pale form the female seems to be much commoner than the male, and all the pale moths appeared towards the beginning of the emergences of the broods.

There are also probably two forms of the type. My bred specimens are all similar, but my series of wild females divides into two different forms with no intermediates between them, though the series is not long enough to determine this point with certainty. My series of wild males is even shorter.

These results are all, except for the F_2 brood, taken from the broods which were divided and kept at different humidities. The

two forms of the melanic occurred in the wet, dry, and control cages indiscriminately (see Table II.).

Earlier work on this species has been done by Hamling (1) Harris (2) and Onslow (3). The last quotes and interprets the results of the former two in the light of his own experiments. He also includes one brood by Porritt and one by Pearce in his tables.

Onslow considers that Hamling's and Harris's results indicate that the factor for melanism, though a dominant, is not a simple Mendelian one. From his own experiments he concludes that this factor is a simple Mendelian dominant, the melanic being constitutionally stronger than the type and thus upsetting the normal Mendelian ratios. He bases this conclusion on the results of his own Heterozygous melanic \times Type pairings (Nos. 5 and 6 in Table IV):—

(a) In his first broods he had 79 melanics and 84 types (which is very near the Mendelian expectation), as the sum of 10 broods and a total number of 163 moths.

(b) His 2nd broods were diseased and his figures were only 37 melanics and 19 types, only a total of 56 moths for the sum of 12 broods.

He concludes from this that in the first broods his survival rate was fairly high, and the types survived in equal number with the melanics, but that in his second broods, where he had a very high mortality, the greater constitutional strength of the melanics showed itself.

I do not agree with him on this point, as his mortality appears to be very high in both cases. Assuming that mortality should be reckoned as a percentage of the eggs deposited, it is unfortunate that he does not give the egg numbers of his broods, but probably they were similar to those in the present series, where the average egg number of 29 broods is 186, and the average number of fertile eggs is 155. If we apply these figures to Onslow's results we get mortality rates from egg deposited to adult of 91·24%, and from fertile egg to moth of 89·48%, for his first broods, and mortality rates of 97·5%, and 97% for his second broods. Admittedly the second rate of mortality is higher than the first, but even the lower rate is quite sufficient to show up any difference in constitutional strength. The cause of the discrepancy in the ratios may be that the melanism is due to more than one Mendelian factor.

In the present experiments, the rate of mortality in the seven broods so far completed is 74·9% from egg deposited to adult, or 60·25% from fertile egg to adult. This is considerably better than Onslow's results, but I hope to improve it still further.

These experiments have given no evidence that the melanics vary from the type in constitutional strength. Melanism does not show in the larvae. A fair number of dead pupae have been opened; most of them have been melanics, but that is only to be expected, because more of the melanics than of the types have been bred. There has also been a rather large number of deformities, and again,

these have more often than not been melanics. Melanic imagines do not appear more active than types, nor do they pair or oviposit more freely.

These experiments are being continued and at present no definite conclusions can be drawn from the results. The breeding ratios have not been by any means consistent, any more than those of previous workers. Two quite distinct forms of the melanic have been obtained; the pale one did not appear until the F_3 generation, and it has failed to appear in the F_4 generation. (It has reappeared in F_5 .)

Finally I should like to say something about Melanism in general. There seem to be three forms of variation, all of which cause a darkening of colour and all of which go by the name of melanism.

In the first the variety is dominant to the type. *H. abruptaria* is an example.

In the second it is recessive to type. *Tephrosia bistortata* is an example.

In the third it is apparently not inherited on Mendelian lines at all, and is represented according to Harrison, (4) by the genus *Oporabia*.

Harrison (5) has demonstrated that the melanism in *Tephrosia crepuscularia* is not really dominant to type at all, but epistatic. He crossed the homozygous melanics of *T. crepuscularia* and *T. bistortata*, and from this, in the F_2 generation, he obtained three forms; which he calls 'crepuscularia greys' (which are melanics), non-melanic types, and 'bistortata blacks' (also melanics). He argues that in *bistortata*, where melanism is recessive to type the factor for type must be absent altogether, so it must have come from the *crepuscularia*, and, since his *crepuscularia* were homozygous for melanism, the melanism must be not dominant, but epistatic to type, and this seems perfectly sound. He also points out that all dominant melanics are similar in that they appear to have the typical markings under a dark mask, and that they are probably all really epistatics. He says also that all recessive melanics appear to be a replacement of the typical markings by an intense uniform black.

It seems unreasonable to assume that these two different forms of variation are genetically similar, or that their causes are similar. The apparently non-Mendelian form of melanism shown by the genus *Oporabia* is probably due to the interaction of a number of Mendelian factors.

The experimental work on *H. abruptaria* has been carried out since October 1933 at the Imperial College of Science, South Kensington, and I must conclude by thanking those who have helped me, particularly Professor Munro, M.A., D.Sc., under whose general direction the work has been done, Mr. H. R. Hewer, M.Sc., D.I.C., who has given me much valuable advice and assistance, and Mr. D. E. Kennard, B.Sc., who prepared the slides for the lecture.

REFERENCES.

- (1) Hamling, T. H., "Trans. City of London Ent. Soc.," 1905, p. 5.
 (2) Harris, E., "Proc. Ent. Soc. Lond.," 1904, p. lxxii, and *ibid*, 1905, p. lxiii.
 (3) Onslow, H., "Jr. Genet.," Vol. XI, No. 3, 1921, p. 293.
 (4) Harrison, J. W. H., "Jr. Genet.," Vol. X, 1920, p. 61.
 (5) ——— "Genetica," 's-Gravenhage, Vol. 14, 1932, pp. 151-159.

TABLE I.

Humidities at which the F_3 broods were reared.

Cage.	Max.	Min.	Av.	Cage.	Max.	Min.	Av.
2D	73	28	44.8	2W	98	67	86.3
3D	68	30.5	46.2	3W	95	66	79.9
5D	71	33	52.2	5W	97	75	85.4
6D	68	44	55.2	6W	96	60	88.4
8D	59	21	41.1	8W	97	77	89.3
14D	75	25.5	44.8	14W	98	73	90.0

N.B.—Cage 2D is the portion of brood F_3 2 reared at low humidity.
 Cage 2W is the portion reared at high humidity, etc.

TABLE II.

Distribution of 'light' and 'dark' melanics and types in the wet, dry, and control cages of the F_3 generation.

Brood.	WET.			DRY.			CONTROL.		
	Melanic.		Type.	Melanic.		Type.	Melanic.		Type.
	Light.	Dark.		Light.	Dark.		Light.	Dark.	
F_3 2	0	15	0	0	18	0	0	3	0
F_3 3	0	1	13	0	0	16	0	0	8
F_3 5	2	14	4	0	13	3	0	12	3
F_3 6	11	13	0	2	30	0	7	14	0
F_3 8	0	9	0	1	9	0	0	9	0
F_3 14	1	8	3	1	6	3	2	5	3
Totals	14	60	20	4	76	22	9	43	14
%	18.9			5			17.3		

N.B.—The types did not vary.

TABLE III.

Breeding results of F_2 and F_3 broods.

m=factor for type. M=factor for melanism.

Female parent placed first.

Brood No.	Pairing type.	Melanic progeny.	Type progeny.
$F_3 3$	mm \times mm	1	37
	(Expectation)	0	38
F_2	Mm \times Mm	62	18
$F_3 5$	" "	41	10
	Total	103	28
	(Expectation)	98.25	32.75
$F_3 14$	Mm \times mm	23	9 *
	(Expectation)	16	16
$F_3 8$	MM \times mm	28	0 †
	(Expectation)	28	0
$F_3 2$	MM \times MM or Mm, or	36	0
$F_3 6$	MM or Mm \times MM	77	0 ‡
$F_3 18$	" "	23	0
	Total	136	0
	(Expectation)	136	0

* This brood included 4 'light' melanic females.

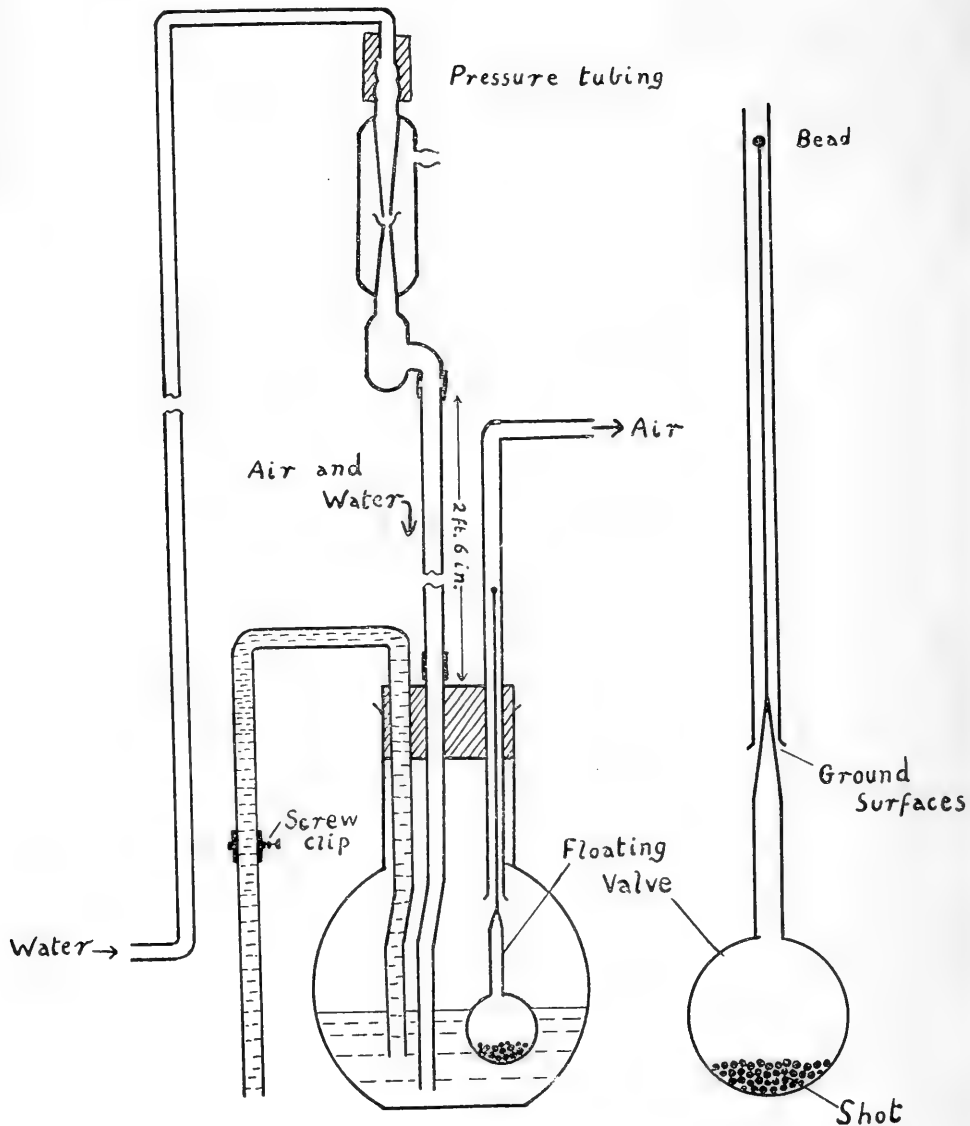
†	"	"	"	1	"	"	"
‡	"	"	"	20	"	"	"

TABLE IV.

Onslow's figures.

Mating.	No. of Broods.	Numbers. Mel.	Numbers. Type.	Expectation. Mel.	Expectation. Type.	Breeders.
(1)						
mm \times mm	3	1	39	0	40	Hamling, 1904 Harris, 1905 Onslow, 1919
(2)						
MM \times MM or 3		92	0	92	0	Harris, 1905
MM \times Mm						Porritt, 1905 Onslow, 1917





Del. G. A. Brett.

THE BLOWING APPARATUS.

TABLE IV.—*Continued.*

(3)						
Mm × Mm	2	87	35	91·5	30·5	Hamling, 1904 Harris, 1905
(4)						
Mm × mm	6	89	53	71	71	Pearce, 1895 Hamling, 1904 Harris, 1905
(5)						
Mm × mm	10	79	84	81·5	81·5	Onslow (1st series, 1919)
(6)						
Mm × mm	12	37	19	28	28	Onslow (2nd series, 1920)

APPENDIX.

The blowing apparatus shown in the diagram and used in these experiments was water driven, and was designed for a rather low pressure supply, not more than the normal household pressure. With this pressure it uses water at the rate of about 15 gallons an hour. It works equally well on a higher pressure, where of course it uses more water, and supplies more air. It has since been used by other workers at the Imperial College to aerate tanks for aquatic larvae. It supplied more than enough air for 20 2lb jam jars, all containing water, connected up by a series of glass T pieces ending in drawn out glass jets, one in each jar.

The necessary materials and connections are shown in the diagram. The following points are essential :—

(a) Pressure tubing must be used for all connections between the tap and the filter pump.

(b) The siphon outlet and the long vertical inlet tube must be at least $\frac{3}{8}$ in. in internal diameter.

(c) At least 2 ft. 6 in. of the vertical inlet tube must be above the cork of the large receiver, to ensure an efficient air supply. Greater flexibility is obtained by having this tube in two pieces, the ends of which meet inside a rubber connection just above the cork.

(d) The inner end of the siphon should be 2 in. above the bottom of the receiver, to ensure that the valve always has a water cushion if it should stick and afterwards fall, though the shot inside usually prevent this.

(e) A litre CO₂ flask was used as a receiver, but any wide necked jar of sufficient size would do, provided the neck is at least 2 in. wide, and can be closed with an airtight bung, and that the jar is at least 5 in. across inside, and at least 7 in. deep below the lower surface of the bung when pushed home.

(f) To regulate the outflow of water from the siphon, a rubber joint with a screw clip is inserted at any convenient point in it, and so adjusted that the water level in the receiver has a slight tendency to rise, and so prevent the escape of air in the wrong direction. This rise is checked when necessary by the floating valve.

The blowing of this valve is a ticklish bit of glass work. A bulb just small enough to go through the neck of the flask, and with fairly thick walls is blown at one end of a piece of $\frac{3}{8}$ in. glass tubing. Enough shot are put in to make it float with rather more than half its depth submerged. About two inches above the bulb the neck is drawn out into a capillary about $\frac{1}{10}$ in. in diameter and 6 ins. long when sealed at the end. The seal must be wide enough to hold the capillary away from the side of the air outlet tube, which has its lower end splayed so that the tapering part of the valve neck can be ground into it.

It may be found necessary to bend the inlet and siphon outlet tubes slightly so that their lower ends are well clear of the floating valve. In assembling the apparatus, great care is necessary to avoid breaking the delicate valve.

Put sufficient water in the receiver to float the valve, and put this in next. Then put in the bung with its various tubes, passing the valve stem up the air outlet. It is very easy to snap it at this stage. Then adjust the height of the lower end of the air outlet so that when the valve is just closing it the water in the receiver covers the lower end of the siphon to a depth of $1\frac{1}{2}$ in. or more.

Notes on the Spilosominae.

By HAROLD B. WILLIAMS, LL.D., F.R.E.S.—Read 27th June, 1935.

The subfamily to which these notes are devoted is a very distinctive group of the *Arctiidae*, and is represented in Britain by 5 species, referable to 4 genera, *Spilarctia*, *Spilosoma*, *Diaphora* and *Phragmatobia*. It may be that the last mentioned genus will be considered to belong to the *Arctiinae*.

I propose to-night to endeavour to clear up some of the confusion which has accumulated about the specific identity and synonymy and the varietal nomenclature of two species in this group, which I will refer to for the moment by names which we all know, the "Buff" and "White Ermines."

These two moths have been confused since the days of Linnaeus. There can be no doubt that the moths described by Linnaeus in 1758 in "*Syst. Nat.*" 1, 505 (No. 47) (10th edn.) as *Bombyx lubricipeda* and *lubricipeda* β are the "White" and "Buff Ermines" respectively. *Lubricipeda* is the specific name of the "White Ermine," and *lutea*, Hufn. "*Berl. Mag.*" II. p. 412 (1766) of the "Buff Ermine."

Dr. M. Draudt, in the Supplement to Vol. 2 of Seitz (1934) p. 79, adopts *lutea* for the "Buff Ermine," but retains *menthastri* (Esp., 1786) for the "White Ermine." It would, no doubt, be very convenient to drop the name *lubricipeda* altogether and avoid any further confusion from the use of the name, but there can be no scientific reason for this action. It is only because *lubricipeda* is the prior name of the "White Ermine," that the name is not available for the "Buff Ermine," though *lubricipeda* β is prior to *lutea* by eight years. In these notes, therefore, *lubricipeda* means the "White Ermine" and *lutea* the "Buff Ermine."

A tangle, closely associated with the confusion in the specific names, which one may profitably examine for a few moments, centres around the insect described by Curtis ("*Brit. Ent.*" V. 92) as *Spilosoma walkerii* and referred to by almost all subsequent writers as "*walkeri*."

The moth described by Curtis was taken by Sir Patrick Walker at Edinburgh at the end of August, 1820, and is figured by Curtis, Pl. 92. Curtis says it is closely allied to *menthastri*, and it would no doubt have been treated as a form of that species, as it was by Stephens in 1829 ("*Illus. Brit. Ent.*"), but for the prevailing tendency to regard as many forms as possible as distinct species, e.g., *Spilosoma urticae*, Esp. and *S. papyratia*, Marsh.

I suppose it would be difficult in the whole history of entomology to find plates more perfectly executed than those by which Curtis' work is illustrated, and one might have supposed the description and figure of *walkerii* to be so accurate that no subsequent error of any sort would be possible. I say one might have supposed this. Unfortunately entomological literature is so full of extravagant errors, that one should perhaps regard the history of *walkerii* as altogether typical.

Gross errors are associated both with the figure and with the description, as well as with the spelling of the name. Dealing with the figure first, this was copied in such a way as to be almost unrecognisable by Humphreys and Westwood ("Brit. Moths," pl. 18, fig. 14, 1860). It was copied "in black and white" in the "Entomologist" (XXVII, 205, fig. 1). This is quite a good copy. Curtis' plate was published both in colour and in black and white, and one would have supposed from the article in the "Entomologist" that South was aware of this fact. In South's "Moths of the British Isles," I, pl. 78, fig. 5, there is, however, to be found an alleged figure of "var. *walkeri*." The draughtsman has evidently worked from the black and white edition of Curtis and has added a coloured body to black and white wings, producing a nice picture of an insect which I do not think is known to exist. *Walkerii* has buff forewings, like the vast majority of *Edinburgh lubricipeda*.

Probably because *walkerii* has buff forewings Butler supposed it to be a form of the "Buff Ermine" (*Spilarctia lutea*). I can conceive no other reason for this error. Butler, of course, was apt to leap to ill-considered conclusions, but it is very difficult to understand how anyone, with the original figure and description before him, could possibly fall into this error, even if he had not access to the original specimen, which is in the Stephens' collection at the British Museum, and which is undoubtedly a variety of the "White Ermine."

Butler's association with the Museum has probably given his work a higher standing with continental entomologists than in fact it deserves, and it may be for this reason that Dr. M. Draudt, in the "Supplement" to Seitz, Vol. II. (1934) has fallen into the same error. Referring to the confusion among the forms caused by the error in the specific names he says that *walkeri*, (sic) Curt., is referred to by many authors and also in the main Volume (p. 87) as a form of "*menthastri*," whilst actually it is a transition to *zatima* and belongs to *lutea*.

Draudt again refers to "*walkeri*" in discussing "*S. menthastri*," and says the form is now classified under *Spilarctia lutea*. He says that the analogous group of forms of "*menthastri*" would be *godarti*, Obth. (= *albiramis*, Strd., ab. 3 Hamps.); *marginestriata*, Mezger, "Bull. Soc. Ent. Fr." 1927, p. 214.

Oberthür ("Études," VI, 326, pl. CXXII, fig. 1085-6) describes and figures a streaked form of *lubricipeda* as *godarti*, and the figures and description are clearly applicable to forms which occur both in England and Scotland and which have for many years been generally, but wrongly, known as *walkerii*. One of these insects is admirably figured by Stephens ("Illus. Brit. Ent. Haustellata," Vol. II., pl. 16, fig. 3.)

Oberthür, in the same volume, describes and names the brown form of *lubricipeda* from Scotland as *brunnea*, ignoring the fact that it was named *ochracea* by Buchanan White many years previously, and one is inclined to the view that he similarly overlooked Curtis' description of *walkerii*, but the forms figured as *godarti* are quite distinct from *walkerii* and the name is a good one.

The well known dark form of *Spilarctia lutea* was described by Haworth ("Tr. Ent. Soc. Lond." I., p. 336) in 1812 as *Bombyx radiatus* (= *Spilosoma radiata*, St. "Ill. Brit. Ent. Haust." II, p. 75) and though it is generally accepted that the insect described as *Noctua zatima* by Cramer in 1781 ("Pap. Exot." IV, pl. ccelxxxii, fig. F.) as a noctuid moth from Surinam, was in fact an example of this species and variety, one cannot help feeling some doubt about the accuracy of this identification.

This variety, with its long series of modifications, has never again, so far as I am aware, been reported from Surinam. It was undoubtedly known from Heligoland very many years ago, and still occurs there. It is of peculiar interest to British entomologists from its occurrence in the eastern counties of England, where it was possibly at some time accidentally introduced from Heligoland, directly or indirectly. It was, for very many years, bred in England and most of our collections contain examples originating in this way, but there are sufficient occurrences of the insect in a wild state, both before and since this wholesale breeding, to justify the treatment of the form as British, notwithstanding the somewhat unsatisfactory documentation of the inbred strain. A certain amount of confusion has existed because for some time the streaked form of *lutea* occurring at York, where I believe it had a rather limited distribution, was spoken of as *radiata*. This form was figured and described by Tugwell as *eboraci* in the "Entomologist," XXVII, p. 205, fig. 2., where (fig. 4) another very distinct form is also described as *fasciata*, and an excellent figure is given. I do not regard either of these forms as having anything whatever to do with *zatima* or as being an intermediate between *zatima* and the type, one of which has been named *intermedia* by Staudinger. Unfortunately I do not know which intermediate this is, though I have been accustomed for many years to treat the forms I exhibit under that name as being correctly named. There are now, however, a whole host of these forms and I have not yet been able to work them out. It has been shown that the *zatima* series of forms

are due to the presence of a principal gene and a number of modifying genes, and I think it unlikely that the names will be found to correspond with the scientific facts.

The species dealt with in this article are :—

Spilarctia, Butler.

lutea, Hüfn.

ab. *zatima*, Cram., *radiata*, St.

ab. *intermedia*, Std.

ab. *eboraci*, Tugwell.

ab. *fasciata*, Tugwell.

Spilosoma, St.

lubricipeda, L. (1758).

menthastri, Esp. (1786).

ab. *walkerii*, Curtis.

ab. *godarti*, Obth., *albiramis*, Strd.

ab. *marginestriata*, Mezger. 

ab. *ochracea*, B. White, *brunnea*, Obth.

Notes on the Plume Moths.

By S. WARELY.—Read 26th September, 1935.

The *Pterophori*, or Plume Moths, have always been of particular interest to the micro-lepidopterist. In spite of this, there have been several species added to the British List in comparatively recent years.

The following notes on certain species which have recently come my way will, I hope, be found of interest.

Pterophorus carphodactyla, Hb., of which I am showing a series, was first discovered to occur in England about thirty years ago, some of the first specimens being taken at Sandown, Isle of Wight, by Mr. L. B. Prout. The larva feeds on *Inula conyza*, Dc. (Ploughman's Spikenard), and I found both larvae and pupae in fair numbers at Eynsford, Kent, on the 9th of June, this year. The larvae (and pupae) were discovered by searching the plants for withered shoots. Upon a close examination of these, the larvae or pupae were discovered well hidden among the fluffy, withered, remains of the attacked shoots. Most were taken low down on the crowns of the plants, but there were several exceptions where the larvae were found at the top of shoots six or eight inches from the ground. Owing to the difficulty of transplanting *Inula conyza*, it is advisable to take the pupae of this brood, and these may be found during the first fortnight in June. The moths emerged from 20th to 26th June from my Eynsford batch.

The second brood larvae have usually been sought for and found during August, feeding in a similar manner in the crowns of the plants that would normally flower the following summer. Last year, however, an interesting habit of the larva was discovered at a field meeting of this Society at Eynsford, Kent. Mr. Andrews found a lepidopterous larva embedded in a flower of *Inula conyza*, which Dr. Blair recognized as one of the *Pterophori*. A supply of flower-heads was collected, and from these several specimens of *P. carphodactyla* emerged. As the larvae may be found feeding in the crowns of the low plants during August, it was at first thought that the larvae had wandered off and selected the flowers as a suitable spot in which to pupate. However, this August, I searched the flower-heads of *I. conyza* in the Isle of Wight, and found the larvae and pupae in such abundance that it is obvious that the larvae of the second brood regularly feed in the flowers, and that only a few odd ones occur in the crowns. As the flower-stalk develops, the leaves on the lower part of the plant wither and dry up, so the only

edible parts of a plant with a flower-stem are the flowers or buds. I observed that a larva extracted from a crown immediately entered a flower when placed in a tin and given the opportunity. The caterpillar feeds head downwards on the base of the petals or unripe seeds, and reverses its position to pupate. A few loosened petals slightly protruding beyond the others were the only clue to the presence of a larva, but as many as half a dozen were found in one spray of flowers. I bred about a score from a small bunch, and several friends to whom I sent supplies reported breeding series of the moth. A number of dead larvae were noted, and ichneumons found as well. In spite of this, the perfect insect must have been very common at the spot I visited. I found larvae of another species of moth also feeding in the flowers of *Inula conyza*, but in this instance the larva fed curled up among the seeds in a very different manner from the Plume larva. One of these emerged, and proved to be *Aristotelia bifractella*, Dgl. a species more commonly found among *Inula dysenterica*, Grtn. Although *Inula conyza* grows in such profusion at Box Hill, a long search has failed to turn up *P. carphodactyla* in that locality, but it has been taken at Rochester and Folkestone in Kent, and Mr. Fassnidge reports that he has found it recently on the Downs near Winchester.

During August, 1934, I visited Freshwater Down in the Isle of Wight and searched for *Alucita spilodactylus*, Curt., which was found in all stages—pupae, full-fed larvae, one imago, and freshly-hatched larvae. The foodplant is *Marrubium vulgare*, L., or White Horehound, and is very local. A very few plants were discovered growing close to the edge of the high cliffs, and these were almost dried up. The minute freshly-hatched larvae were extracted from buds with a needle and placed on a growing plant. These larvae fed very slowly, and in March were quite difficult to detect with the naked eye, even though some were out of the buds then and resting on the stem. Later, I observed two larger larvae and others still very small. Although one tried unsuccessfully to pupate, I regret I was unable to rear any of these, but the fact that my plant suffered severely from the attacks of green-fly was no doubt the chief cause of my larvae failing to feed up in a normal manner. Mr. T. Bainbrigge Fletcher, to whom I sent a few shoots containing small larvae, reported that he bred one moth on 12th July and that a larva was still feeding on 17th August. This one eventually died, after having been in the larval state for over twelve months. Specimens of the moth are shown.

Pselnophorus brachydactylus, Tr., is given in Meyrick's "Hand-book" as "very scarce." Mr. T. Bainbrigge Fletcher has discovered this species near Stroud, Gloucestershire, and in some seasons the larvae and ova are not uncommon on *Lactuca muralis*, Fresen. (Wall Lettuce). I am indebted to him for larvae and ova, and the specimens shown were bred from these. The moths emerge during

June, ova may be found in July, and the young larvae hibernate among dead leaves from the beginning of August till the following spring. I found that dead holly leaves make first-class hibernating material for the larvae. Quite by accident I discovered that the larvae will feed in confinement on *Lapsana communis*, L. (Nipplewort), a very common plant around London, and they will certainly eat the garden lettuce, but this is not satisfactory as a foodplant, and cannot be recommended. At Box Hill the Wall Lettuce is locally very common, but I have failed to find the moth there.

Another species which I took this year for the first time is *Oxyptilus heterodactyla*, Vill., perhaps better known to the older collectors as *teucii*, Jord. Larvae of this Plume were taken at the Box Hill Field Meeting of this Society on 11th May, and again on 16th June at Broadwater Forest. The larva eats a hole into the stem of its foodplant, *Teucrium scorodonia*, L. (Wood Sage), which causes the affected part to droop in a very characteristic manner. An examination of these stems shows that the larva feeds on the wilted leaves, but they match the colour of the foodplant and are not easy to see, especially when small. This species suffers a great deal from the attacks of parasites, and I failed to rear any imagines from the larvae collected at Broadwater Forest. No doubt the healthy larvae had pupated, only diseased or parasitized ones being left at this date (16th June).

The larva of *Stenoptilia zophodactylus*, Dup., feeds on the seeds of *Erythraea centaurium*, Pers. (Red Centaury)—or *Centaurion umbellatum* as it is called now. I have bred it from seed-heads collected at Eynsford, Kent, and Sandown, Isle of Wight. When rearing this species the small larvae of a beetle are often noticed. I keep my seed-heads in linen bags, examining them from time to time, and as the beetle larvae require earth in which to pupate, mine have always died but Dr. Blair succeeded in rearing some last year when they proved to be *Smicronyx reichi*, Gyll.

In conclusion, I should like to mention that there are 34 different species of *Pterophori* recorded for Great Britain, several of which are quite rare, with very local foodplants.

A Few Remarks upon British Rhynchophora.

By F. J. COULSON.—*Read 14th November, 1935.*

Coleoptera have been of such interest to me, a one-time Lepidopterist, that I regard that fact as sufficient grounds for encouraging others to give attention to the Order. In my opinion the study of Coleoptera has many advantages over that of Lepidoptera, as collecting can be actively pursued throughout the year, the species generally are widely distributed, their habits and habitat are very varied, and abundant material can be secured for study during the winter evenings. To deal with British Coleoptera as a whole would be too lengthy a task for this evening, so the scope of my remarks will be limited to the group Rhynchophora. I also propose to deal with my subject from an insular point of view, and to arrange my remarks to give practical aid to those who seek to observe in the field the life-history of the different species.

Rhynchophora, or weevils, are characterized by the head extending in front of the eyes in the form of a rostrum, the length of which varies considerably. The British species are separated into three main families. The first, *Anthribidae*, do not possess the scape, or prolonged first joint of the antennae, which is possessed by the other two families, the *Curculionidae* and *Scolytidae*. The elytra either cover the whole of the abdomen, or leave the pygidium (the final segment) or a little more, exposed. The tarsi are four-jointed with the penultimate joint bilobed.

The number of species of Rhynchophora that occur in Britain is approximately 567, or nearly 16 per cent. of the total Coleoptera on the British list. As regards my home county, Surrey, there are records, to my knowledge, that 421 of these species have been taken. I exhibit examples of such species as I possess and commend to beginners that they put aside one specimen of each male and female as determined, or short series and examples of the varietal forms, in the numbered sequence of an up-to-date list, such as Beare's 1930, as a ready reference for comparison purposes, and thus build up experience of the group to facilitate determination of their captures in the field.

The determination of the sexes is not always an easy matter. Apart from the genitalia, however, the individual species have usually some characteristic upon which separation can be effected. Thus in the genus *Byctiscus* a spine is present on the thorax in the male. Generally speaking differences may be evident in the length of the antennae, the shape or colour of the joints, or the position

of the antennae on the rostrum, the length or shape of the rostrum, the presence of teeth on tibiae or hook at the apex in the male, or the shape of the tibiae or the posterior portion of the elytra. This latter characteristic is strongly developed in some of the *Scolytidae*.

In Rhynchophora, so far as the British Isles are concerned, variation is not a strong feature. The separation of those varietal and aberrational forms that have been named is based upon the tint or shape of the scales, or the pattern made by them, on peculiarities of pubescence, ground colour, and the difference of the ground colour of a part from the normal colouring. Usually the forms are co-extensive with the type, but in some areas a particular aberrational form may be predominant. In some instances the varietal form is the usual if not the only form taken in this country. Such are *Otiorrhynchus morio*, F. v. *ebenus*, Gyll.; *Otiorrhynchus arcticus*, Ol. v. *blandus*, Gyll.; *Otiorrhynchus desertus*, Rosh. v. *muscorum*, Bris.; *Barynotus squamosus*, Germ. v. *schönherri*, Zett.; *Phytonomus pastinaciae*, Ross. v. *tigrina*, Boh.; *Ceuthorrhynchus roberti*, Gyll. v. *alliariae*, Bris.; *Ceuthorrhynchus mölleri*, Thom. v. *rotundatus*, Bris.

The genus *Phyllobius* exhibits a wide range in the colouring of the scales. *Cleonus piger*, Scop. has a form in the Oxford district coloured like the sand of the locality. In the white-pebbled area of Chesil Beach, *Limobius mixtus*, Boh. has a whitish scaled form, whilst on the Deal Sandhills a yellow scaled form is prevalent. On the Donegal coast *Cneorrhynchus plagiatus*, Schall., which normally is greyish, produces a large white form. The specimens of *Ceuthorrhynchus rugulosus*, Hbst. and of *C. melanostictus*, Marsh., also *Sitona griseus*, F., taken in the same locality, vary a great deal.

The dissimilarity of the striped var. *alternans*, Steph., from the typical *Phytonomus adspersus*, F. is very striking, whilst the red-thorax form ab. *collaris*, Rye, of *Liosoma deflexum*, Pz. is a strong contrast to the normal form. Many colour forms occur in the *Byctiscus* genus, and in *Rhynchites aeneovirens*, Mm. there is a blue form, ab. *fragariae*, DeG. In a form of *Ceuthorrhynchus contractus*, Mm. the pale colour of the legs is the aberrational character, whilst black-legged specimens of the normal red-legged *Phyllobius pyri*, L. and *Orchestes avellanae*, Don. are of occasional occurrence.

In this connection it may be mentioned that occasional individual specimens show a distortion of the striae of the elytra and that in certain species possessing normally 7-jointed antennae specimens occur with only 6 joints.

As the larvae are herbivorous the perfect insects are mainly found associated with vegetation, and, as many are pests, they are generally soon in evidence when the collecting of Coleoptera is commenced. Each portion of a plant is the pabulum of a varying number of species in the larval state and there are few plants that are not attacked. The genus *Orchestes*, the members of which in the perfect state, owing to the strong development of their hind

femora, have jumping powers, are leaf miners. Stems of low plants are tunnelled by the species of *Apion*, nuts and fruits have their internal feeders (for example *Balaninus* species in nuts and acorns) and roots of certain plants are subject to attacks by species of the genera *Otiorrhynchus*, *Ceuthorrhynchus*, etc. The bark and solid wood of trees are infested by a large number of species of Rhynchophora many of which are of considerable economic importance owing to the depredations committed in woodlands.

The action of the larvae of many species feeding on low plants causes the formation of galls, or swellings on the stem, bud, seedpod or roots. The following notes, which are not exhaustive, may be useful to those who may be desirous of pursuing this interesting subject. As regards the genus *Apion*, the larva of *A. semivittatum*, Gyll. lives in swellings on the stems of Dog's Mercury, *A. minimum*, Hbst. has been found in a gall produced by the Sawfly *Pontania* on species of *Salix*, stem swellings on broom are caused by *A. immune*, Kby. and on the young shoots of furze by *A. scutellare*, Kby. *A. sanguineum*, Deg. forms a gall on the roots of *Rumex acetosella*, L.; *A. frumentarium*, Payk. and *A. curtirostre*, Germ. on the midrib or petiole of the leaf, and *A. affine*, Kby. on the floral stems of *Rumex acetosa*, L. *A. laericolle*, Kby. forms a gall on *Trifolium repens* and *A. vicinum*, Kby. on *Mentha* and *Nepeta*, whilst *A. gyllenhali*, Kby. has been reared from swellings of the leaf stalk of *Vicia*. *A. brunnipes*, Boh. larvae live in a gall on the terminal bud of *Filago*, and *A. atomarium*, Kby. makes ovoid red swellings on *Thymus*.

In the genus *Gymnetron*, *G. veronicae*, Germ. and *villosulum*, Gyll. form galls on the ovary of the Water Speedwell; *G. linariae*, Pz. and *collinum*, Gyll., gall the base of the stem and *antirrhini*, Pk. the capsule of *Linaria vulgaris*, Mill.

The larvae of *Ceuthorrhynchus pleurostigma*, Mm., occur in galls at the base of the stem of various species of *Cruciferae*, *C. hirtulus*, Germ., on Whitlow grass, whilst *C. assimilis*, Pk., causes tumours on the roots of the Hedge Mustard.

On *Campanula* the action of the larvae of *Miarus campanulae*, L., causes a swelling of the capsule, while *Mecinus pyraeter*, Hb. on *Plantago lanceolata*, L., and *Mecinus collaris*, Germ. on *Plantago maritima*, L., cause swellings of the floral axis.

Tubercles are formed on the stems of *Matthiola incana*, R.Br. by the action of the larvae of *Baris laticollis*, Mm. A swelling is produced on the stems of sallow by the feeding of *Cryptorrhynchus lapathi*, L. larvae.

Balaninus villosus, F., has been reared from the galls of *Cynips*.

Abnormal buds of *Pyrus* or *Rubus* may denote the presence of the larvae of *Anthonomus* species.

Apart from the gall-forming species, there is also ample scope in Rhynchophora for rearing the perfect insects from the infested flowers and pods of *Leguminosae* and other low plants. Thus the

larvae of *Ceuthorrhynchus punctiger*, Gyll., is found in the seedheads of dandelion, of *Apion pisi*, F., and *A. subulatum*, Kirb., in pods of *Lathyrus*. The larvae of *Apion loti*, Kby., *Tychius flavicollis*, Steph., and the rarity *Pachytychius haematocephalus*, Gyll., occur in pods of *Lotus*. The seedpods of laburnum as well as the catkins of poplar, are the pabulum of *Dorytomus longimanus*, Först. The grubs of the genus *Apion* will be much in evidence in this connection, as for example, in cloverheads *Apion nigritarse*, Kby., in heads of *Matricaria* *Apion hookeri*, Kby., and in seedheads of mallow *Apion malvae*, F., may be found. The recent discovery of the larvae of *Smicronyx reichi*, Gyll., shows how much information as to the life-history of species of Coleoptera is yet to be ascertained by the investigation of the earlier stages.

Some of the larvae of wood-boring species suffer from the attacks of the larvae of certain species of Clavicornia, another section of the Coleoptera. Thus *Anlonium trisulcum*, Geoff., is parasitic on certain species of the genus *Eccoptogaster*, and *Laemophloeus ater*, Ol. on *Phloeophthorus rhododactylus*, Mm. On the other hand the larvae of *Anthribus fasciatus*, Först., are parasitic on the *Coccus* of the whitethorn, and *Anthribus variegatus*, Först. on that of the pine.

Although very many species of Rhynchophora can be secured in the perfect state by general sweeping or beating, an elementary knowledge at least of the identity of plants is necessary for making the acquaintance of the many desired species that are restricted in their pabulum. The possibility of any particular species occurring in a given locality of course depends upon the presence of its food-plant, but the distribution of certain species is limited although the foodplant may be widely spread. Some plants are very localized and in consequence many species confined to them have necessarily a restricted distribution.

The methods of collecting, generally speaking, come under the following eight heads.

(a) Beating trees and shrubs. This method is most productive at blossom time and when there is young foliage.

(b) Beating decayed trees and bushes, or faggot stacks, and sifting broken sticks and other hedge bottom refuse, over the beating tray.

(c) Stripping bark of living or dead trees and the examination of broken branches or twigs for woodboring species.

(d) Sweeping low plants, or preferably shaking the flowery growths into the sweeping net.

(e) Sweeping aquatic plants with a water net for species of *Bagous* and *Hydronomus*, *Tanysphyrus lemnae*, F. and many species of *Phytobius*.

(f) Sifting vegetable refuse, weedheaps and haystack refuse throughout the year and the examination of moss on stumps and tree-trunks during the winter. The heaps of weeds, left by the hedgers after the banks have been trimmed, have afforded me many

good species. Flood rubbish left by rivers and brooks is also productive, at times, of good species that occur in the flooded locality. *Alophus triguttatus*, F. and the rarity *Lepyrus capucinus* Schall. occur under these conditions.

(g) Stone turning, especially on open spaces. Searching the lower leaves of low plants, grubbing at the roots and pulling up tufts of grass, in both wet and dry localities, for disintegration over the beating tray, or a sheet of paper.

(h) The examination of stored grain, mill refuse and foodstores, as butter beans and dried fruits, for *Calandra* and others.

As regards trees and shrubs, oak, birch, hawthorn and hazel, when in leaf, harbour a very large number of species which can be secured by beating. From aspens may be expected such species as *Byctiscus populi*, L., *Rhynchites tomentosus*, Gyll., *Dorytomus tortrix*, L. and *D. dejeani*, Fst.; from species of *Pomaceae*, *Rhynchites caeruleus*, DG. and *R. paucillus*, Germ., *Anthonomus pomorum*, L., *A. cinctus*, Koll. and *A. humeralis*, Pz.; and from *Rosaceae* members of the genus *Magdalis*. On broom occur *Apion fuscirostre*, F. and *A. immune*, Kl., *Phloeophthorus rhododactylus*, Mm., *Phyllobius marginatus*, Steph., *Tychius venustus*, F. and *T. pusillus*, Germ. and on mountain ash, *Anthonomus conspersus*, Desb.

The willows and gorse are also productive. On the former occur *Apion minimum*, Hbst., *Rhamphus pulicarius*, Hbst. and several of the genus *Orchestes* and on the latter *Apion striatum*, Germ. and *A. scutellare*, Kby., *Polydrosus confluent*, Steph. and *Sitones regensteinensis*, Hbst. and *S. tibialis*, Hbst. Coniferous trees suffer much from the attacks of the pests *Hylobius abietis*, L. and *Pissodes notatus*, F., while *Orchestes alni*, L. and *Anthonomus inversus*, Bed. occur on elms and *O. fagi*, L. as its name implies, on beech. Even the blossoms of the horse chestnut, it is recorded, are very attractive at times to *Anthribus fasciatus*, Först.

Sweeping under trees, especially after a high wind, is often productive of species of *Balaninus* and certain *Dorytomus*, and at eventide wood-boring species occasionally turn up in the net.

Species attached to low-growing plants are occasionally found in numbers on trees, as *Apion cracca*, L. which frequents *Vicia cracca*, L. and *Lathyrus pratensis*, L. is sometimes found commonly on oak, ash or lime, and, at times, *Apion laevigatum*, Pk., is beaten out of hedges. *Orchestes pratensis*, Germ. is another instance, whilst *Otiorrhynchus sulcatus*, F., a pest on strawberries, is found also on loganberries and raspberries.

General sweeping in chalky and sandy places, in marshy spots, and amongst low plants produces as a rule an abundance of specimens and this may lead to a loss of interest in the commoner species. It is therefore desirable that closer attention should be paid to particular plants occurring in the area worked, as this would ensure more accurate information being obtained, both as regards the foodplants of the commoner, and the isolation of the foodplants of the

rarer species. General sweeping, however, frequently reveals the presence of unsuspected species in a locality. The perfect insects of Rhynchophora are usually found associated with the foodplant of the larvae, but much depends upon the time of the year as to the species likely to be taken by sweeping. I give some instances of particular low plants and their inhabitants which may be of interest.

On *Lotus* and the clovers occur a large number of species, many *Apion*, *Phytonomus trilineatus*, Mm. and *Tychius flavicollis*, Steph. On *Vicia*, *Apion cracca*, L., etc. On *Ononis spinosa*, L., *Apion ononicola*, Boh., *A. ononis*, Kby. and *A. seniculum*, Kby., and on *Echium vulgare*, L., *Ceuthorrhynchus geographicus*, Goetz. and *C. euphorbiae*, Bris. *Fumaria* harbours a number of good species, e.g., *Ceuthorrhynchus nigrinus*, Mm. The thistles are productive and on these occur *Ceuthorrhynchus litura*, F., *C. trimaculatus*, F. and *C. triangulum*, Boh., species of *Cleoninae*, *Rhinocyllus conicus*, Froehl., *Tanymecus palliatus*, F. and the very local *Larinus planus*, F. and *Ceuthorrhynchidius horridus*, Pz. In their haunts, *Apion pallipes*, Kby. and *A. semivittatum*, Gyll. and *Ceuthorrhynchus moguntiacus*, Shulz. occur on Dog's Mercury. *Sisymbrium* and the various Cruciferous plants have many inhabitants, including *Ceuthorrhynchus pyrrhorhynchus*, Mm., *C. sulcicollis*, Pk., *C. erysimi*, F., and *C. contractus*, Mm. On *Matricaria* and ox-eye daisy, occur *Apion stolidum*, Germ. and *A. confluent*, Kby., and *Ceuthorrhynchus chrysanthemi*, Germ. Four species of *Apion* can usually be shaken out of Mallows, particularly on the coast. The Thyme frequenting species of *Apion* are mostly taken by searching at the roots. The yarrow is also productive, *Verbascum* and *Scrophularia* plants are usually productive of the genus *Cionus*. In salt marshes *Artemisia maritima*, L. has several species of interest, as *Polydrosus chrysomela*, Ol. and *Phyllobius artemesiae*, Desbr.; *Myrica gale*, L. in the New Forest is productive of *Orchestes iota*, F. *Gymnetron antirrhini*, Pk. and *G. collinum*, Gyll. are taken on *Linaria vulgaris*, Mill.

The fruits and seeds of Woodsage, *Mentha*, and *Veronica*, *Melilot*, *Erysimum sinapis*, L. and Cruciferous plants generally are the pabulum of a large number of Rhynchophora. Even bracken when swept may produce certain desired Apions.

General sweeping in marshy places, damp meadows, the vicinity of ponds and streams, may produce *Poophagus sisymbrii*, F., *Ceuthorrhynchus cochleariae*, Gyll., *C. melanarius*, Steph. and *C. melanostictus*, Mm. sometimes in abundance, and species of *Eriirhinus* and *Notaris*. In growths of *Carex* during the evening *Nanophyes marmoratus*, Gz., may possibly be swept. Ditch side vegetation should be swept for certain *Rhinoncus* and *Limnobaris* species. Downs and cliffsides are productive, especially at dusk, for *Trachyphloeus*, *Apion* and *Ceuthorrhynchus*.

Decaying trees and bushes, dead hedges and faggot twig stacks should be beaten into the tray as these harbour many desiderata,

such as the *Anthribidae* and species of *Magdalis*. *Tropideres albirostris*, Hb., has been taken on dead branches of oak and bramble. *Choragus sheppardi*, Kby., is recorded as having been taken on dead twigs and also settled on tree trunks near the roots. Dead gorse produces *Pityophthorus ramulorum*, Perr. and *Hylastinus obscurus*, Mm.; and decaying ivy, *Rhyncolus lignarius*, Mm. and *Cissophagus hederæ*, Schmidt.; *Phloeophthorus rhododactylus*, Mm., can be beaten from broom at the fall of the year, with *Acalles ptinoides*, Gyll. *Eremotes ater*, L., is taken on decaying elms, and on the sea shore the groynes are tenanted by *Codiosomus spadix*, Hb. and *Canlotrupis aeneopiceus*, Boh. In their haunts *Rhinomacer attelaboides*, F., and *Magdalis phlegmatica*, Hb., are taken by shaking the loppings of coniferous trees. The gathering of sticks for internal feeders, as twigs of fir for *Pityogenes bidentatus*, Hb., is sometimes profitable, whilst in November *Xylocleptes bispinus*, Df. in clematis stems, is abundant.

As regards woodboring species, oak, fir, pine, elm, ash and beech are each very productive. Higher branches that have been broken off by the wind often give a good haul. In this connection if a suitable fir stump is available, it is a good plan to remove a large area of the bark before eating your lunch and during the repast several of the woodboring species as *Pityophthorus ramulorum*, Perr. and *Ips acuminatus*, Gyll. and other species may appear at intervals on the moist surface of the stump. A half burnt standing birch on one occasion yielded a good series of *Xyleborus saxeseni*, Ratz. and a decayed branch of a living oak on another occasion a good series of *Xyloterus domesticum*, L., simply by keeping my eye focussed for a short period on an area of the bark. The sudden appearance of the insects has always been a mystery to me. Many woodboring species can also be obtained by sweeping beneath the trees to which they are partial, e.g., *Hylesinus fraxini*, Pz. under ash. The superficial bark feeders as *Magdalis armigera*, Gf. are often seen crawling over the trunks but the deep seated feeders as *Xyloterus* usually require hard work to secure.

Sifting vegetable refuse when heated by the sun is productive of species of *Otiorrhynchus*, *Strophosomus*, *Caenopsis* and *Trachyphloeus*. In haystack refuse occur *Apion pubescens*, Kby., and *Phytonomus nigrirostris*, F., whilst cut grass and weed heaps in gardens produce a variety of species. At the fall of the year *Liosoma* and *Barypithes* species and *Cionus pulchellus*, Hb., harbour in moss. The rarities *Procas armillatus*, F., and *Orobites cyaneus*, L., are mentioned as taken under these conditions.

Searching at the roots of plants and disintegrating turf for the root feeders and species that hide at the roots of plants is hard work, but by this method many desiderata, found only exceptionally under other conditions, are secured. Species of *Otiorrhynchus*, *Sitona*, *Baris*, *Caenopsis* and *Orthochaetes* are more or less abundant.

Baris lepidii, Germ. is taken at the roots of *Barbarea*; at the roots of *Lotus*, *Sitona waterhousei*, Walt. and some species of *Trachyphloeus*; at the roots of *Sisymbrium*, *Baris laticollis*, Mm.; and of *Helianthemum*, *Trachyphloeus spinimanus*, Germ.; *Ceuthorrhynchus quadridens*, Pz. occurs at the roots of *Cruciferae* generally; and amongst those of heath *Cleonus piger*, Scop. and *Conioleonus nebulosus*, L., whilst at the roots of thyme occurs *Ceuthorrhynchidius rufulus*, Duft.

To those commencing the study of Coleoptera I would stress that particular attention should be paid to the apparently commoner species as I am confident that there are many species yet to be recognized. In this connection much work has been done on the genus *Bagous*, but the accurate determination of the species is, in my opinion, still very difficult. It sometimes happens, particularly when you are a tyro, that you meet with a species commonly in a locality and neglect to take a series, contenting yourself merely with a representative. When you have effected the determination it may be years before you can secure your series even in the locality where previously common. The principle that should be adopted therefore, is to learn to distinguish, in the field, the closely allied species and secure your series while you may. It is desirable that from each locality visited, especially if far apart, at least a short series even of the common species met with, should be taken for comparison. The recent discovery of *Cathormiocerus britannicus*, Blr., which closely resembles *Cathormiocerus myrmecophilus*, Seidl., and of *Phyllobius artemisiae*, Desbr., which occurs on certain salt marshes and closely resembles the abundant *Phyllobius pyri*, L., are cases that I have in mind.

Every step should be taken to ensure that notes of the locality, habitat and date of capture of the species taken should be accurately and systematically made. Any specimens taken under unusual conditions should receive careful examination.

It is best, in my opinion, to concentrate on a particular section of Coleoptera until one is acquainted with all the species likely to be found in the localities accessible.

By the methods of collecting Rhynchophora which I have mentioned, specimens of other groups will be taken. These can be put aside, duly labelled with the details of capture, until time permits or enthusiasm prompts the extension of your studies.

I have endeavoured to confine my remarks to such species as may be of interest to the incipient Coleopterist, and in conclusion, I trust that the remarks will encourage those hesitant to take up the study of Coleoptera.

ADDENDUM TO p. 39 (ANNUAL EXHIBITION).

A REMARKABLE ABERRATION OF ARGYNNIS AGLAIA, L.—While collecting on the South Downs on 22nd July, 1935, my attention was attracted to a grassy slope, where I noticed plenty of butterflies on the wing and in particular an unusual number of *Argynnis aglaia*. It was not long before I observed a small group of this species chasing an individual of very abnormal appearance. This insect settled in front of me on a thistle and I quickly had my net over it. It turned out to be the remarkable aberration here shown, but I was much disappointed to find that the right side of the specimen was so badly damaged. However, the extraordinary concentration of the black spots into a band of striated markings together with the fine rayed underside made this insect a most gratifying and noteworthy capture. I have not so far been able to come across a similar type of variety of this species in any collections with which I am familiar.—CHARLES DE WORMS, Milton Park, Egham, Surrey.

[See Plate I. facing p. 38.]

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Proceedings & Transactions
OF
THE SOUTH LONDON
ENTOMOLOGICAL & NATURAL HISTORY
SOCIETY

1936-37

WITH FOUR PLATES



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PRICE TEN SHILLINGS AND SIXPENCE.

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- 1920 FARMER, J. B., 156, Loughborough Park, Brixton, S.W.9. *l.*
- 1924 FASSNIDGE, Wm., M.A., F.R.E.S., 47, Tennyson Road, Portswood, Southampton. *l, n, hem.*
- 1930 FERRIER, W. J., 86, Portnalls Road, Coulsdon, Surrey. *l.*
- 1936 FINNIGAN, W. J., 6, Shrublands Grove, Worcester Park, Surrey. *ent.*
- 1887 FLETCHER, W. H. B., M.A., F.R.E.S., Aldwick Manor, Bognor, Sussex. (*Life-Member.*) *l.*
- 1926 FLETCHER, P. Bainbrigge, M.Sc., A.I.C., F.R.E.S., "Winscombe," Copsen Drive, Esher, Surrey. *c, l.*
- 1889 FORD, A., "South View," 42, Irving Road, West Southbourne, Bournemouth, Hants. *l, c.*
- 1920 FORD, L. T., "St. Michael's," Park Hill, Bexley, Kent. *l.*
- 1915 FOSTER, T. B., "Downlands," 24, York Rd., Selsdon, Surrey. *l.*
- 1907 FOUNTAINE, Miss M. E., F.R.E.S., "The Studio," 100A, Fellows Road, Hampstead, N.W.3. *l.*
- 1921 FRAMPTON, Rev. R. E. E., M.A., Innhams Corner, Crowborough, Sussex. *l.*
- 1933 FRASER, Angus, "Ranelagh," Gloucester Road, Tankerton, Kent. *c.*
- 1886 FREMLIN, Major H. S., M.R.C.S., L.R.C.P., F.R.E.S., "Heavers," Ryarsh, Kent. *l.*
- 1912 FROHAWK, F. W., F.R.E.S., M.B.O.U., "Essendene," Cavendish Road, Sutton, Surrey. *l, orn.*
- 1928 GILLES, W. S., F.R.E.S., F.I.C., "The Cottage," Bocking, Braintree, Essex. *l.*
- 1930 GILLIATT, F. T., F.R.E.S., 25, Manor Road, Folkestone, Kent. *l.*
- 1929 GLEGG, D. L., F.R.E.S., "Birchstone," Coombe Park, Kingston, Surrey. *l.*
- 1936 GOODBAN, B. S., F.R.E.S., 81, West Street, Ewell, Surrey. *l.*
- 1936 GOODE, FRANK, 275, Eastern Avenue, Ilford, Essex. *l.*

YEAR OF
ELECTION.

- 1935 GOODLIFFE, F. D., Agricultural College, Long Sutton, Basingstoke. *ec. ent.*
- 1920 GOODMAN, A. de B., F.R.E.S., The Old Malt House, Shenley, Church End, nr. Bletchley, Bucks. *l.*
- 1926 GORDON, D. J., B.A., F.R.E.S., Craigellachie House, Strathpeffer, Ross. *c., l.*
- 1924 GRANT, F. T., 37, Old Road West, Gravesend. *l.*
- 1924 GREER, T., J.P., "The Bungalow," Sandholes, Dungannon, Co. Tyrone. *l.*
- 1926 GREY, Olive, Mrs., F.Z.S., 90, Charing Cross Road, W.C.2. *ent.*
- 1933 GROCOCK, L. O., "Brasted," 53, Sherwood Road, Addiscombe, Croydon.
- 1911 GROSVENOR, T. H. L., Springvale, Linkfield Lane, Redhill. *l.*
- 1934 GUNTON, Major H. C., M.B., F.R.E.S., "Rathgar," Gerrards Cross, Bucks. *l.*
- 1891 HAMM, A. H., A.L.S., F.R.E.S., 22, Southfields Road, Oxford. *l.*
- 1903 HARE, E. J., F.R.E.S., 41, Avenue Gardens, Acton, W.3. *l.*
- 1926 HARMSWORTH, SIR HILDEBRAND A. B., F.R.E.S., 19, Princes Gate, S.W.7.
- 1933 HARRIS, Chas. W., 7, Roseberry Gardens, Dartford. *l.*
- 1936 HARRIS, W. H. A., 48, Corringway, W.5. *l.*
- 1924 HARWOOD, P., F.R.E.S., Westminster Bank, 292, Wimborne Road, Winton, Bournemouth. *l.*
- 1927 HAWGOOD, D. A., 2, Kingsmead Road, Tulse Hill, S.W.2. *l.*
- 1924 HAWKINS, C. N., F.R.E.S., *Council*, 23, Wilton Crescent, Wimbleton, S.W.19. *l.*
- 1929 HAWLEY, Lt.-Col. W. G. B., Sibton Church Farm, Yoxford, Suffolk.
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Estacion Experimental, Concordia, F.C.E.R., Argentina. *l. orn, c.*
- 1937 HAYWARD, L. W., "Haslemere," Summerhill Road, Dartford, Kent. *ent.*
- 1936 HEDGES, A. V., F.R.E.S., "Milton Ernest House," Milton Ernest, Beds. *l.*
- 1920 HEMMING, Capt. A. F., F.Z.S., F.R.E.S., 18, Glebe Place, Chelsea, S.W.3. *l.*
- 1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *c.*
- 1931 HERRMANN, E. R.,
- 1931 HESLOP, I. R. P., M.A., F.R.E.S., 34, Henleaze Gardens, Westbury-on-Trym, Bristol and Nigerian Administrative Service, Obetim, Warri Province, viâ Sapele, Southern Nigeria, West Africa. *l.*

YEAR OF
ELECTION.

- 1927 HEWER, H. R., M.Sc., D.I.C., Royal College of Science, S. Kensington, S.W. 7.
- 1920 HODGSON, S. B., "St. Philips," Charles Street, Berkhamsted, Herts.
- 1927 HOWARD, J. O. T., M.A., "Wedderburn House," Hampstead, N.W.3.
- 1931 HOWARTH, T. G., 77, Woodland Rise, Muswell Hill, N.10. *l.*
- 1934 HUGGINS, H. C., F.R.E.S., 875, London Road, Westcliff-on-Sea. *l, ent.*
- 1929 HUGHES, A. W., "Delamere," Buckingham Way, Wallington. *l.*
- 1933 HUTCHINGS, H. R., 127, Chadacre Road, Stoneleigh, Surrey. *l.*
- 1928 JACKSON, F. W. J., "The Pines," Ashted, Surrey.
- 1914 JACKSON, W. H., "Pengama," 14, Woodcote Valley Road, Purley. *l.*
- 1923 JACOBS, S. N. A., *Hon. Secretary*, Ditchling, 54, Hayes Lane Bromley. *l, el.*
- 1924 JAMES, A. R., 14, Golden Lane, E.C.1. *l.*
- 1924 JAMES, R., F.R.E.S., 14, Golden Lane, E.C.1. *l.*
- 1936 JAMES, W. H., 41, Carson Road, Dulwich, S.E.21. *l.*
- 1927 JANSON, O. J., F.R.E.S., *Recorder*, 13, Fairfax Road, Hornsey, N.8. *ent.*
- 1936 JARRETT, J., 9, Lytton Gardens, Wallington, Surrey.
- 1925 JARVIS, C. McK., 68, Clyfford Rd., West End Road, Ruislip, Middlesex. *c. (?)*
- 1923 JOHNSTONE, J. F., F.R.E.S., "Courtlands," Clarence Parade, Southsea. *l.*
- 1933 JONES, H. G. C., "Shere," 33, Berrylands, Surbiton, Surrey. *l.*
- 1936 KENNARD, D. E. G., B.Sc., 3, Vanburgh Pk. Rd. West, S.E.3. *ent.*
- 1928 KETTLEWELL, Dr. H. B. D., "Homefield," The Common, Cranleigh, Surrey. *l.*
- 1933 KEYWOOD, K. P., "Croft Cottage," Hare Lane, Claygate, Surrey. *ent, orn.*
- 1910 KIDNER, A. R., "Southwood," The Drive, Sidcup, Kent. *l.*
- 1925 KIMMINS, D. E., 2, Avington Grove, Penge, S.E. 20. *l.*
- 1933 KING, H., D.Sc., F.R.S., "Amanita," 28, Hawthorne Avenue, Northwick Park, Harrow. *l, orn.*
- 1935 KIRBY, Miss Kathleen, S. L. F.,
- 1925 LABOUCHERE, Lt.-Col. F. A., F.R.E.S., 15, Draycott Avenue, S.W.3.
- 1927 LAWSON, H. B., F.R.E.S., "Churchmead," Pirbright, Surrey. *l.*

YEAR OF
ELECTION.

- 1922 LEECHMAN, C. B., "Pansala," Roundabouts, Storrington, Sussex. *l*.
- 1914 LEEDS, H. A., Wood Walton, near Sawtrey, Huntingdon. *l*.
- 1934 LINE, H. V., "Brookside," St. Peters Road, Orpington.
- 1933 LIPSCOMB, C. G., LIEUT., "Mumfords," Batheaston, Bath.
- 1936 LOWE, CAPT. J. H. B., R.E. 69, Oakwood Court, W. 14. *l*.
- 1931 MACNULTY, B. J., *Council*, "Rutland," 67, All Saints Road, Sutton, Surrey. *l*.
- 1892 MAIN, H., B.SC., F.R.E.S., F.Z.S., 9, Woodside Road, Woodford Wells, Essex. *l, nat. phot., c*.
- 1889 MANSBRIDGE, W., F.R.E.S., "Monreith," Derby Road, Formby, Liverpool. *l, c., etc*.
- 1932 MARCON, REV. J. N., Christ Church Vicarage, Seaside Road, Eastbourne. *l*.
- 1930 MARSH, D. G., "Brackla," 31, The Crossways. Sutton, Surrey. *l*.
- 1922 MASSEE, A. M., D.SC., F.R.E.S., East Malling Research Station, Kent. *l*.
- 1934 MEARS, T., 97, Pepys Road, Wimbledon, S.W.20.
- 1932 MELLOWS, W. T., M.B.E., LL.B., Scatton, Thorpe Road, Peterborough.
- 1936 MILBORROW, G., 83, Hargwyne St., Stockwell, S.W.9. *l*.
- 1889 MOORE, H., F.R.E.S., 9, Hoopwick Street, Deptford, S.E.8. *l, hem, d, e l, e hym, e d, mi*.
- 1930 MORLEY, A. McD., 9, Radnor Park West, Folkestone.
- 1920 MORISON, G. D., B.SC., PH.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marischall College, Aberdeen. *ec. ent*.
- 1937 MORTIMER, D. A., 39, Stobhill Villas, Morpeth, Northumberland. *hym*.
- 1935 MULLER, Miss I. M., "Appledore," Mugswell, Chipstead, Surrey.
- 1934 MUSGRAVE, A. J., 21, Loveday Road, W.13.
- 1906 NEWMAN, L. W., F.R.E.S., Salisbury Road, Bexley, Kent. *l*.
- 1930 NIBLETT, M., *Vice-President*, 10, Greenway, Wallington, Surrey. *galls*.
- 1926 NIXON, G. E., B.A., 3², Kenway Road, Earl's Court, S.W.5. *hy, l*.
- 1936 NORTON, Wallis, S. G., Norton House, Peaks Hill, Purley, Surrey. *ent*.
- 1932 O'FARRELL, A. F., 20, Crescent Road, Wimbledon, S.W.19. *l*.
- 1934 OLIVER, G. B., "Hazlemere," High Wycombe, Bucks. *l*.
- 1935 OWEN, A. H., 41, Coombe Road, Croydon, Surrey. *l*.
- 1911 PAGE, H. E., F.R.E.S., 9, Vanbrugh Hill, Blackheath, S.E.3. *l*.

YEAR OF
ELECTION.

- 1927 PALMER, D. S., "North Lodge," Esher.
- 1908 PENNINGTON, F., Oxford Mansions, Oxford Circus, W.1. *l.*
- 1928 PERKINS, J. F., F.R.E.S., 19, Courtfield Gardens, S.W.5. *h.*
- 1933 PEYTON, A. G., "Holly Bank," 6, Napleton Road, Ramsgate. *l.*
- 1933 PINHEY, E. C. G., 70, Tisbury Road, Hove. *ent.*
- 1933 PINNIGER, E. B., 19, Endlebury Road, Chingford, E.4. *p, l.*
- 1933 POOLES, S. W. P., "Richmond," Alderman's Drive, Peterborough. *l.*
- 1912 POULTON, PROF. Sir E. B., D.SC., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.R.E.S., "Wykeham House," Oxford. (*Hon. Member.*)
- 1927 PRATT, W. B., 10, Lion Gate Gardens, Richmond Lane, Richmond, Surrey.
- 1924 PRIEST, C. G., 67, Portland Road, Holland Park, W.11. *l.*
- 1904 PRISKE, R. A. R., F.R.E.S., 136, Coldershaw Road, W. Ealing, W. 5. *l, mo.*
- 1922 RAIT-SMITH, W., F.Z.S., F.R.E.S., F.R.H.S., "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*
- 1925 RALFS, Miss E. M., F.R.E.S., 27, Shaftesbury Road, Ravenscourt Park, W.6.
- 1920 RICHARDSON, A. W., F.R.E.S., 28, Avenue Road, Southall, Middlesex. *l.*
- 1936 RICHARDSON, N. A., 68, Finchley Lane, Hendon, N.W. 4. *l.*
- 1934 RIDEOUT, J. K., "Hodgsonites," Charterhouse, Godalming, Surrey. (*Life Member.*)
- 1908 RILEY, Capt. N. D., F.R.E.S., F.Z.S., 7, McKay Road, Wimbledon, S.W.20. *l.*
- 1910 ROBERTSON, G. S., M.D., "Struan," Storrington, near Pulborough, Sussex. *l.*
- 1911 ROBINSON, Lady MAUD, F.R.E.S., Kirklington Hall, Newark. *l, n.*
- 1920 ROTHSCHILD, THE RIGHT HON. LORD, D.SC., F.R.S., F.L.S., F.Z.S., F.R.E.S., Tring, Herts. *l, orn.* (*Life Member.*)
- 1936 ROYFFE, D. W., 2, Imperial Mansions, Bromells Rd., Clapham, S.W.4. *l.*
- 1932 RUDLAND, W. L., 211, Caversham Road, Reading.
- 1932 RUSSELL, A. G. B., M.V.O., F.R.E.S., Scarbank House, Swanage, Dorset. *l.*
- 1936 RUSSELL, J. A. P., Scarbank House, Swanage, Dorset. *ent.*
- 1915 RUSSELL, S. G. CASTLE, "Springetts," Seaview Road, Highcliffe-on-Sea, Hants. *l.*
- 1936 SARD, G. J., 71, Sistova Road, S.W. 12. *l.*

YEAR OF
ELECTION.

- 1936 SCOPES, GOWING E., "Oakhurst," Oakwood Road, Crofton, Orpington, Kent. *l.*
- 1908 ST. AUBYN, Capt. J. G., F.R.E.S., F.R.P.S., 14, Purley Knoll, Purley.
- 1927 SCOTT, E., M.B., "Hayesbank," Ashford, Kent. *l.*
- 1923 SEVASTOPULO, D. G., F.R.E.S. (*Life Member*), c/o Ralli Bros. Ltd., Calcutta. *l.*
- 1933 SHARMAN, F. W., 183, Star Road, Peterborough. *l.*
- 1910 SHELDON, W. G., F.Z.S., F.R.E.S., "West Watch," Oxted, Surrey. *l.*
- 1898 SICH, ALF., F.R.E.S., Coburg Court Hotel, Bayswater Road, W.2. *l.*
- 1921 SMART, Major, H. D., R.A.M.C., M.D., D.S.C., F.R.E.S., 172, High Road, Salway Hill, Woodford Green. *l.*
- 1908 SPERRING, C. W., 8, Eastcombe Avenue, Charlton, S.E. 7. *l.*
- 1927 STANLEY-SMITH, F. S., F.R.E.S., *Vice-President*, "Oaklands," Brampton, Huntingdon. *l.*
- 1928 STANLEY-SMITH, Mrs. Maud, "Oaklands," Brampton, Huntingdon. *l.*
- 1934 STEPHENS, J. A., 44, Mount Road, Chatham.
- 1936 STIGAND, Miss B., 175, Gloucester Place, London, N.W.1. *hortic. ent.*
- 1924 STOREY, W. H., 39B, High Drive, New Malden, Surrey. *ent.*
- 1931 STOVIN, G. H. T., M.R.C.S., L.R.C.P., "Sevenhurst," 42, Chalkwell Avenue, Westcliff-on-Sea, Essex.
- 1936 STREETER, ERNEST, Petworth, Sussex. *l.*
- 1929 STUBBS, G. C., 31, Egremont Street, Ely, Cambs.
- 1934 SUTTON, G. R., 6, Kenilworth Gardens, Loughton, Essex.
- 1916 SYMS, E. E., F.R.E.S., *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *n, orth., p.(od.), t.*
- 1922 TAMS, W. H. T., F.R.E.S., 5, Daisy Lane, Hurlingham, S.W. 6. *l.*
- 1913 TATCHELL, L., F.R.E.S., Swanage, Dorset. *l.*
- 1934 TAYLOR, J. O., Lyndhurst, Grosvenor Road, Orpington. *l.*
- 1925 TAYLOR, J. S., M.A., F.R.E.S., P.O. Box 45, Graaffe Reinett, C.P., Union of S.A. *l.*
- 1929 TETLEY, J., "White Cottage," Silverlea Gardens, Horley.
- 1931 THOMPSON, J. A., F.R.E.S., Tan-y-Bryn School, St. Margarets Drive, Llandudno, N. Wales. *l.*
- 1935 TOMPKINS, L. H., "Clifton," 18, Forest Side, Worcester Park, Surrey.

YEAR OF
ELECTION.

- 1902 TONGE, A. E., F.R.E.S., *Council*, "Aincroft," Grammar School Hill, Reigate. *l*.
- 1934 TUNSTALL, H. G., 11, St. James Avenue, Ewell, Surrey.
- 1887 TURNER, H. J., F.R.E.S., F.R.H.S., *Hon. Editor*, "Latemar," 25, West Drive, Cheam, Surrey. *l, b, e.l.*
- 1889 WAINWRIGHT, C. J., F.R.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*
- 1929 WAINWRIGHT, J. Chas., 9, Priory Road. Hook Road, Surbiton, Surrey.
- 1911 WAKELY, SIR LEONARD D., K.C.I.E., C.B., 7, Parkside Gardens, Wimbledon, S.W.19. *l.*
- 1930 WAKELY, S., *Council*, 4, Auckland Road, Upper Norwood, S.E.19. *l.*
- 1880 WALKER, Comm. J. J., M.A., F.L.S., F.R.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c.*
- 1936 WARRIER, R. E., 147, Friern Road, London, S.E.22. *l.*
- 1920 WATSON, D., "Proctors," Southfleet, Kent. *l.*
- 1928 WATTS, W. J., 42, Bramerton Road, Beckenham. *c.*
- 1928 WELLS, Clifford, "Dial House," Crowthorne, Berks. *l.*
- 1911 WELLS, H. O., York Gate, Cheam Road, Ewell. *l.*
- 1911 WHEELER, The Rev. G., M.A., F.Z.S., F.R.E.S., "Ellesmere," Gratwicke Road, Worthing. *l.*
- 1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.
- 1934 WHITEHOUSE, Prof. Sir H. Beckwith, K.B.E., M.B., M.S.LOND., F.R.C.S., F.R.E.S., 62, Hagley Road, Birmingham.
- 1925 WILLIAMS, H. B., LL.D., F.R.E.S., "Redmayes," 79, Broad Lane, Hampton-on-Thames, Middlesex. *l.*
- 1932 WILLIAMS, S. W. C., 17, Beresford Road, Chingford, E.4. *l.*
- 1927 WITTING, A. N., 6, Woolstone Road, Forest Hill, S.E. 28.
- 1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*
- 1926 WOOTTON, W. J., F.R.H.S., Wannock Gardens, Polegate, Sussex. *l.*
- 1927 DE WORMS, C. G. M., M.A., PH.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C., Milton Pk., Egham, Surrey. *l, orn.*

Members will greatly oblige by informing the Hon. Sec. of any errors in, additions to, or alterations required in the above Addresses and descriptions.

REPORT OF THE COUNCIL FOR 1936.



Speaking generally, the present season, owing to its wetness and the coldness of the summer may be called a poor one from the point of view of field work, but the Society's field workers seem to have carried on energetically, with undiminished numbers, and were rewarded with one or two very interesting captures.

There were the usual twenty-two meetings and the Annual Exhibition; four papers were read by:—J. A. Downes, B.Sc. (2), F. Stanley-Smith, F.R.E.S., and S. N. A. Jacobs. Short papers were contributed by E. A. Cockayne, A.M., D.M., F.R.C.P., F.R.E.S., C. N. Hawkins, F.R.E.S., A. F. O'Farrell, and S. Wakely. The average attendance was 40·5.

The standard of exhibits has been good and the notes supplied by the exhibitors have this year added considerably to the value of the exhibits; it is hoped that this habit of careful recording will grow on all members, remembering always that the more such notes are received, the greater will be the value of the Society's annual publication. The thanks of the Society are due to those gentlemen whose careful preparation of exhibits has done much to add to the interest of meetings.

The Annual Exhibition took place on the 22nd October, and there was the usual good attendance, 248 members and visitors signing the attendance book. Although, as is to be expected, Lepidoptera predominated amongst the exhibits, practically all Orders received some attention, and many were well represented; there were living exhibits, also a section of drawings and photographs of flowers, insect life, and fishes. The social side of this meeting was as successful as usual, and it was good to see so many of our country members coming up for this occasion to renew old acquaintances and make new ones.

Twelve field meetings were held at, Effingham (T. R. Eagles); East Horsley (C. G. M. de Worms, M.A., Ph.D.); Tilgate Forest (T. R. Eagles); Broadwater Forest (G. V. Bull, B.A., M.B.); Warley Common (E. E. Symes, F.R.E.S.); Cutt Mill (F. Stanley-Smith, F.R.E.S.); Chalfont Road (K. G. Blair, D.Sc., F.R.E.S.); Benfleet and Thames Marshes (R. W. Attwood); Epsom (M. Niblett);

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Gomshall (F. D. Coote. F.R.E.S.); Blackheath, Chilworth (F. J. Coulson); and Byfleet (F. J. Coulson). A meeting was also arranged for Box Hill, but as this coincided with a Southern Railway excursion to the New Forest, it was agreed to drop this meeting in order that members might take advantage of this chance of visiting Brockenhurst.

You will have noted from the Treasurer's Report, which has just been read to you, that the Society's financial position is very satisfactory, but it is again brought to the notice of members that payment of subscriptions as near as possible to the 1st of January of the year in question will save the treasurer, who is, after all, an honorary official, a considerable amount of unnecessary correspondence.

The membership of the Society is now 254, consisting of 211 full members, 36 Country members, 2 honorary members, and 5 life members; there have been fifteen resignations, one death, and twenty-one elections. Report has also come to hand of the death of Mr. D. J. Rice some years ago.

The Society was represented at the Annual Congress of the South-Eastern Union of Scientific Societies by Mr. Hy. J. Turner and Dr. G. V. Bull, and their report will be included in the volume of Proceedings and Transactions for 1936-37.

The volume of Proceedings and Transactions for the season 1935-36 appeared in July and consists of 118+xxiv pp. + 10 plates, which, besides publishing the papers read during the year, includes also a long account, read in part by Mr. Turner, of a six months collecting tour of the Argentine republic, by Captain Hayward. It has been, as usual, well reviewed in the entomological publications, and our thanks are due to those gentlemen whose generosity has enabled us to include so many plates.

The Curator reports that donations to the Society's collections include the collection of Hymenoptera made by our late member Mr. G. E. Frisby of Gravesend, and presented by his widow. The series of Fossores is almost complete and contains many rare species; this collection will shortly be available to members for study. Mr. H. W. Andrews presented two boxes of Diptera while other donations were received from Dr. K. G. Blair. Dr. G. V. Bull, Dr. N. H. Joy, and Messrs. G. A. Brett, R. J. Collins, G. B. Oliver, and S. Wakely.

The Librarian reports that during the season there has been an increase in the number of borrowers, and also of the books taken

out on loan. The library has been increased through the usual methods of purchase, exchange and donation, and periodicals have been bound.

The following additions to the Library were recorded :—

Books.—"Sketches from Nature in Northern Ireland" (Miss Brooke); Guide to the Collection in the Horniman Museum; "Hunting Insects in the South Seas" (Mrs. Stanley-Smith); "Clothes Moths and House-Moths" (Brit. Museum).

PERIODICALS.—Entom.; E.M.M.; Ent. Rec.; Nat. Hist.; Vasculum; Ent. News.; Argentine Revista.

PROCEEDINGS, ETC.—Bull. and Ann. Soc. Ent. de France; Ann. Rept. Smithsonian Inst.; Proc. Coventry N.H.S.; Rep. N. India Expedition; Trans. Wisconsin Acad.; Rep. U.S. Nat. Museum; Jnrl. Essex Naturalist; Jnrl. Com. and Footpaths Pres. Society; Jnrl. Socy. British Entom.; Bull. Lloyd Lib. and Museum; Proc. Ent. Soc. Brit. Columbia; Trans. Norfolk and Suffolk Nat. Socy.; Proc. I. O. Wight Nat. H. Scy.; Proc. Roy. Irish Acad.; Revue d'Entomologie de l'U.R.S.S.; Jnrl. London N.H.S.; Jnrl. Zool. Riga; Jnrl. Zool. Upsala; Jnrl. O'hara Inst.; Mem. Connecticut Acad. of Arts and Science; Trans. and Proc. Perthshire Soc. of Nat. Sc.; Bull. Zool. Lab. Portici; Essex Nat.; Trans. Leicester Lit. and Phil. Soc.; Jnrl. Univ. Lib. Sweden; Trans. and Jnrl. Eastbourne N.H.S.; Jnrl. Shanghai Sci. Inst.; Trans. Hereford N.H.S.; Ent. Beihefte Berlin; Hertford N.H.S. and Field Club.; Bull. Biologique et Medicin.

SEPARATES.—Changes in fauna and flora in past 50 yrs. (Sep. Linn. Scy. Dr. Blair); U.S. Nat. Museum; Vienna N.H.S.; Field Museum; Chicago N.H.S.

HON. TREASURER'S REPORT, 1936.

I present to-night my first report as your Treasurer. I hope I have done my work well, for no one could have had a better start. My predecessor's work gave me a clear record of the past and an excellent model for the future.

The accounts are drawn up in the same form as in the past. You will see from them that our position is as sound as ever.

In round figures our income has been £212 and our expenditure £20 less at £192. This £20 is reflected in the Balance Sheet where you will find our balances add up to £74 9s. 5d. against £54 10s. 1d. last year. Thus we have more lying at the Bank, but I regard this as purely a temporary matter following, as it does, a year of exceptionally reduced expenditure.

Examining the items in detail it will be noticed that the collection of current subscriptions has produced slightly more than last year, the payments in advance are about the same, but the arrears collected are £14 less. Had I been able to keep up to last year's figure of arrears there would have been hardly any collectable items left.

This time we have a full year's income from the further £200, the bequest of the late Mr. Robert Adkin, invested in $3\frac{1}{2}\%$ Conversion Loan. Thus the dividends are £5 up at £22 2s. 1d.

Owing no doubt to the fact that we did not this year bring it so much to the notice of our visitors, the Refreshment Fund produced £5 less. The amount was £15 14s. 6d. Our bill for catering was £21 10s. exactly the same as last year, so that the General Fund had to find £6. The other revenue expenditure making up, with the catering, a total of £92 15s. 10d. was much as before. This is because the main item is our rent of £50 which does not vary.

The grant to the Publications Fund was £62 which is £13 less than last year. The Library Fund also required less—only £5 against £11 last year.

Entrance Fees £2 10s. go to the Suspense Account. Their total is 15/- more than last year—a small matter from a monetary point of view but a welcome sign of progress.

Our annual volume cost £77 5s. 5d. to print. This is £15 less than before and, as the income of the fund from War Loan,

Donations, etc., totals about the same as last year, the call on the Revenue Account is, as I have already mentioned, less by £13. I take the opportunity of thanking those who are in the habit of making a donation to the Publications Fund when paying their annual subscription.

You will notice a new Fund this year. It is the Illustrations Fund and arises from a donation of £20. I cannot tell you who gave this handsome gift for I do not know. But I am sure you are all very grateful to so generous a friend. After paying for the blocks and for the printing of the illustrations there was £5 5s. 6d. left over as a start towards finding the sum necessary for next year's illustrations.

The Balance Sheet total is about £5 more than last year. Our funds in cash are £20 up, but this is offset to the extent of £15 by a fall in the value of our Investments.

Mr. F. D. Coote on behalf of the Council and Mr. G. R. Sutton on behalf of the other members audited the accounts on 23rd January. They were kind enough to come to Enfield for the purpose. I am very grateful to them for their courtesy in so doing and for their patience in going through the figures.

The accounts will be printed in due course when you will be able to examine them at your leisure. They are here for inspection to-night and I shall be happy to answer any questions so far as I can.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

STATEMENT OF ACCOUNTS FOR THE YEAR 1936.

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REVENUE ACCOUNT.

<i>Expenditure.</i>	£ s. d.				<i>Income.</i>	£ s. d.	
To Rent of Rooms	50	0	0		By Subscriptions :—		
„ Insurance	1	10	9		Current	112	5
„ Income Tax	2	7	3		Arrears	8	2
„ Attendance	2	10	0		In advance	14	17
„ Secretarial Expenses	9	10	0			6	
„ Treasurer's „	3	18	8		Dividends :—		135
„ Catering	21	10	0		On 4% Consols	6	3
„ Bank charges	1	9	2		„ 3½% Conv. Loan	15	18
Subscriptions.				92		5	
South-Eastern Union of S. Societies	15	0			Refreshment Fund Donations		22
Commons and Footpaths Preser-					„ Deposit interest		15
vation Society	10	6		1	Balance brought forward		4
Grants to				5			6
Publication Fund	62	0	0	6			0
Library Fund	5	0	0	0			13
				67			0
Balance carried forward..	..	..	..	60			47
				1			18
				3			0
				£221			2
				2			7
				7			

LIBRARY FUND.

	£ s. d.					£ s. d.	
To Books purchased	0	8	6		By Balance brought forward	1	18
„ Bookbinding	0	18	0		„ Grant from General Fund..	2	0
„ Sub. to Ent. Mo. Mag. (postage of	0	15	0			5	0
„ Librarian's Expenses						0	0
Proceedings, etc.)	3	10	0				
				5			
				11			
				6			
				1			
				6			
				8			
Balance carried down .. ..	..	..	..	£6			18
				2			2

To Balance carried forward..	..	..	6	9	3	£ s. d.
By balance brought forward	..	..	..	..	..	3 19 3
Entrance fees	..	..	..	..	..	2 10 0
						<u>£6 9 3</u>

PUBLICATION FUND.

To Printing Proceedings	..	..	77	5	5	0	14	8
„ Balance carried forward	..	..	1	7	9	..	..	2 4 6
						..	..	3 4 0
						..	..	10 10 0
						..	..	62 0 0
								<u>£78 13 2</u>

ILLUSTRATIONS FUND.

To Blocks	..	..	8	11	6	..	..	20 0 0
„ Printing illustrations	..	..	6	4	0	..	..	..
„ Balance carried forward	..	..	5	4	6	..	..	..
								<u>£20 0 0</u>

BALANCE SHEET.

		Liabilities.		Assets.			
		being excess of assets over liabilities					
To Balance,	£ s. d.			By Balances—	£ s. d.		
	1198 0 0			Revenue a/c	60 1 3		
				Suspense a/c	6 9 3		
				Publication Fund	1 7 9		
				Library Fund	1 6 8		
				Illustrations Fund	5 4 6		
				„ Investments at current quotations	74 9 5		
				£300 3½% War Loan at 105½	316 2 6		
				£591 3½% Con. Loan at 106½	628 13 6		
				£154 4% Consols at 112½	173 14 7		
				„ Subscriptions unpaid valued at	118 10 7		
					..	5 0 0	
							<u>£1198 0 0</u>

Examined and found correct, this 23rd January, 1937.

F. D. COOTE
GRESHAM R. SUTTON } Auditors.



Fold-out Placeholder

This fold-out is being digitized, and will be available on a future date.



ABSTRACT OF PROCEEDINGS.

13th FEBRUARY, 1936.

Mr. M. NIBLETT, PRESIDENT, in the Chair.

Mr. A. J. Musgrave exhibited a varied selection of insects collected in Brazil, during the summer of 1935. The locality was around Bello Horizonte, Minas, "The Brazilian Highlands." The Collection included Orthoptera, Coleoptera and Lepidoptera. Among the last were *Danais erippus*, Cr., *Archonias uniplaga*, Fruh., *Adelpha abia*, Hew., *Eunica margarita*, Gdt., etc.

Mr. Turner exhibited eleven specimens of *Pieridae* from Ecuador, representing nine genera. *Callitaera aurora*, Wstw. and *C. pireta*, Cr., two diaphanous species; *Haetera pieta*, L. another transparent species, shaded delicately with brown; *Pieris cinerea*, Hew. a smaller species, black with but little white or yellowish white on both sides; two species of *Terias*, a world wide genus of smaller yellow butterflies with slight marginal black markings only on the upperside; *Daptonoura lycimnia*, Cr., a pointed fore-wing species, white with black margins, larger than the last, and with bright yellow on the underside of the lower wings; *Hesperocharis nera*, Hew., a somewhat similarly shaped insect of a bright yellow with black apex of fore-wing and underside of hindwings beautifully streaked with black along the veining; *Leptophobia eleone*, D. and H. another bright yellow and black butterfly with the black so arranged on the fore-wing as to allow the yellow to have the shape of a cottage loaf, underside wholly light yellow; *Charonias eurytele*, Hew., a remarkable species, shape, colour and markings like a small *Heliconius* or *Ithomia* on upper and undersides of both wings, of which Danaine species it is a mimic; and *Catasticta sisamnus*, Fb., a smaller Pierid, black, with a wide white band across both wings and a row of white submarginal dots, representative of a genus of numerous quite distinctive species occurring in the Americas.

Mr. T. R. Eagles exhibited the Sharp Sea Rush, *Juncus acutus*, L.

A large number of Lantern-slides were shown by Messrs. Doudeney, De Muth, and Hughes depicting collecting grounds in various parts of the country, many of them views taken in the Shetlands. This was followed by a selection of the slides bequeathed to the Society by the late Robert Adkin.

AUG 27 1937

27th FEBRUARY, 1936.

The PRESIDENT in the Chair.

Mr. Bunnett exhibited a number of cases made by Caddis-fly larvae, some taken in a state of nature and others made in captivity, the materials used being matchsticks, silk, coal-dust, etc.

Mr. G. B. Oliver exhibited hibernating larvae of *Limenitis camilla*, Lin. (*sibilla*, Lin.) in their hibernacula, and a photograph of the sleeves, in which they have been so far carried through the winter.

Mr. A. J. Musgrave exhibited a Humming-bird and nest, from Brazil, near Bello Horizonte, Minas. The bird was caught by the exhibitor placing his hand over bird and nest.

Mr. S. Wakely exhibited some leeches which were found in a garden at Norwood. He stated that they were often seen when digging. An enquiry was made as to their scientific name, and Mr. J. A. Downes was able to state that it was *Trocheta subviridis*, Dutroch., a species with subterranean habits.

Mr. Wakely also exhibited two species of coleopterous larvae found in a workshop at Bunhill Row, Finsbury. These were taken under old cork lino and among dirt and rubbish, and proved to be *Attagenus piceus*, Ol. (var. *megatoma*, Fab.) and *Anthrenocerus australis*, Hope. The latter had not hitherto been recorded in Great Britain ("E.M.M." LXII. 1936, p. 174), but the exhibitor reported that they occurred regularly at the spot where these larvae were found.

Dr. E. A. Cockayne exhibited a series of *Gonodontis* (*Odontopera*) *bidentata*, Clrck., part of a brood bred from a female taken at Rannoch in 1914 by W. S. Brocklehurst. Ground colour the tint of straw with strongly marked transverse lines. The light specimens heavily speckled with dark brown strigae in the marginal area, more lightly speckled in the basal area, with the central area almost clear. In the darker ones, which form the majority, the brown strigae almost conceal the ground colour and give a mottled appearance, but here and there the speckling is much less, leaving irregular patches distributed asymmetrically.

Mr. Hy. J. Turner exhibited 12 species of *Catasticta*, a genus of Pierine butterflies peculiar to the Americas. There are about 70 species described and many figured in Vol. V. of Seitz "American Rhopalocera." The males are said to have the peculiar habit of settling in the sunshine on water-washed stones on the banks of the mountain streams, and drinking so greedily that the water

comes out again in drops at short intervals. They are often washed off the stones by the water, which appears not to harm them, for they immediately emerge from the water and settle again on the stones. They are distributed in the mountains of the west from Mexico to S. Brazil.

He also exhibited a box of Danaids of the *plexippus* group, and pointed out that a species with a "white band" was described under the name *plexippus* by Linnaeus, who expressly stated that this white band character was similar to that in the species *chrysippus*, L. (See "Systema Naturae," p. 47, 1758.) The insect now going under the name *plexippus* is definitely not white banded. Linnaeus gave the locality for his insect as America. Evidently the label was misplaced. We may assume that Linnaeus was sufficiently intelligent to recognize a white band when he saw it. The insect named *plexippus* is undoubtedly the Indian and Eastern species, which in its various forms, has the *chrysippus*-like white band. The American insect is *D. archippus*, Fab. The fact that no Danaid with "white band" is found on the American continent should convince any one, that the *immovable* label view must be an error.

Kirby in his "Synonymic Catalogue" uses the name *plexippus* for the Indo-Malay species, with white band like *chrysippus*. Moore of the India Museum was in agreement for he marked his copy of Kirby (now in Mr. Turner's library) with the Indian *plexippus* as the type of *Danaus*. Waterhouse and Lyell in their work on Australian Butterflies, Colonel Bingham in his "Fauna of British India," and Major Evans in his recent work on the Butterflies of the same region are all agreed with this view. Finally we come to the Seitz works. Fruhstorfer, who arranged the Indo-Malay Rhopalocera of Seitz, says that Linnaeus "erroneously transferred its locality to America." In the corresponding American volume of Seitz, Haensch uses the name *archippus*, F.b. for the American Danaid *without* a white band.

Mr. J. A. Downes then read a paper entitled "Insect Metamorphosis." (See Trans.)

12th MARCH, 1936.

The PRESIDENT in the Chair.

Messrs. S. P. Doudeney of Purley; B. J. Leader of Bude, Cornwall; N. A. Richardson of Hendon; and D. E. G. Kennard of Vanburgh Park Road West, were elected Members.

Dr. Joy exhibited a box containing examples of three-quarters (approx.) of the species of British Fleas.

Mr. Hy. J. Turner exhibited a very large race of the Hesperiid, *Adopoea flava*, Brn. (*linea*, Schiff.) (*thaumas*, Hufn.) from Macedonia, medium sized specimens from Catalonia, with the more normal sized forms from Cassel (Germany) and Les Bossons, Chamounix, to which the name *sylvestris*, Poda, was being attached. Poda specifically described his species as having on the forewing a "linea lanceolata," which description could not apply to *flava* (*linea*) but obviously referred to one of the two species now known as *sylvanus*, Esp. and *comma*, Linn., probably to the former as Dr. L. G. Higgins suggested ("Ent. Record," XLVI. p. 44, 1934). Attention was called to the very large size of the Macedonian race.

The remainder of the evening was devoted to an exhibition of Lantern-slides.

Mr. Bunnett showed the Life-histories of *Dicranura vinula*, L., *Lycaenopsis argiolus*, L., *Chrysopa flava*, Scop., *Chrysopa flavifrons*, Brau., and of a species of Syrphid (Dip.).

A large selection of the late Mr. R. Adkin's slides, illustrating many varieties of Lepidoptera with normal forms for comparison, were then thrown on the screen.

26th MARCH, 1936.

The PRESIDENT in the Chair.

Mr. M. Niblett exhibited the following Plant Galls from S.E. France:—*Contarinia ilicis*, Kieff. (Cecidomyiid) on leaves of *Quercus ilex*, L.; *Tephritis conura*, Lw. (Trypetid) in flower-heads of *Cnicus oleraceum*, Scop. and *Aphid* sp. on twigs of *Rhus* sp.

Mr. A. J. Musgrave exhibited a false-scorpion, one of the *Chelonethi*, from Penn Woods, Bucks.

Dr. Bull exhibited a large coleopterous larva which was thought to be that of *Lucanus cervus*, L.

Mr. Hy. J. Turner exhibited a store-box filled with many forms of the Noctuid species (or group of species) known as *Euxoa* (*Agrotis*) *tritici*, L. with the form (or separate species) *aquilina*, Schiff., saying that it was many years since a series of it had been shown at the Society, and asking if any member had taken it of recent years. He pointed out that the variation was so extreme that a large number of names had been given to its forms, that scarcely two authors

agreed as to the application of these names, a good proportion of them were now considered as good species by Corti-Draudt in Seitz' work, and it seemed to be practically impossible satisfactorily to classify these forms. As regards specific discrimination F. N. Pierce has shown that in the genus *Agrotis* there are practically no appreciable specific differences in the genitalia. The series exhibited as *aquilina* and *tritici* were exactly as named by the previous owners, and were undoubtedly gloriously mixed indicating the prevailing ignorance of these two forms or species. He remarked on the striking parallelism between the forms of *tritici* taken in the Isle of Lewis and those from Aberdeen, some of them being very beautiful. The noticeable similarity of most specimens taken at Montrose was referred to. The little Irish specimens from Down, Kerry, Donegal, etc. appeared to form quite a local race.

Mr. Turner also exhibited a cactus plant of the genus *Opuntia* and stated that the Cacti were indigenous to the Americas, and were inhabitants mainly of hot, dry and arid areas. Some species had been taken to similar areas of the old world and Australasia where they had established themselves with such phenomenal energy, that vast areas had become covered with an impenetrable growth and rendered economically useless. It was impossible to destroy this growth by normal means, but a somewhat small moth has been discovered, whose larvae feed upon the green leaf-like stems. This moth, of which a series was exhibited, sent by our fellow member Mr. J. Sneyd Taylor, from S. Africa, is known as *Cactoblastis cactorum*, and is now being bred by him (Mr. Sneyd Taylor) on behalf of the S. African authorities, and distributed to those areas where the cactus is prevalent. The plants are reduced to empty shells by the larvae, and can then readily be burnt. Similar work is also being done in Australia and New Zealand, where also the cactus has become dominant over very large areas.

Mr. Stanley Smith read a paper on the rearing of *Mellinia ocellaris*, Bork. (See Trans.)

9th APRIL, 1936.

Mr. F. J. COULSON, VICE-PRESIDENT, in the Chair.

Mr. E. G. Scopes, of Orpington, was elected a member.

Mr. D. W. Royffe exhibited specimens of the following S. Indian Coleoptera :—*Oryctes rhinoceros*, L., *Prionomma atrata*, ., *Sternocera sternicornis*, L., and *S. chrysis*, .,

Mr. Wallis Norton exhibited a seed-pod of *Datura stramonium*, L. (Thorn-apple) and said that according to the Rev. C. A. Johns this plant is neither indigenous nor truly naturalized. It belongs to the Natural Order *Solanaceae* (Nightshade Tribe), and occurs on waste ground. Rare. Fl. June-July. Annual.

This specimen was found on some waste ground on the drive down to the Municipal Car Park at Croydon. The plant was then much withered and only a few seed pods remained thereon. October, 1935.

Capt. W. Crocker exhibited an aberration of *Maniola jurtina*, L. in which there was no apical spot above on the forewing and below only a small elongate spot.

Mr. Eagles exhibited larvae of *Triphaena fimbria*, L. bred *ab. ovo*.

Mr. A. W. Dennis showed lantern slides of the ova of several species of *Syrphus* (Dip.) and of egg-shells of *Strymon* (*Thecla*) *w-album*, Knoch.

A further selection of the slides of the late Mr. R. Adkin, was shown.

11th APRIL, 1936.

FIELD MEETING.—EFFINGHAM.

Leader.—MR. T. R. EAGLES.

April 11th was Easter Saturday so that many members, who regularly attend Field Meetings, were away. Moreover the weather was unusually cold, the coldest Easter for 35 years. Thus it was not surprising that the attendance (12 members and one visitor) was smaller than in recent years.

A shower of wintry rain greeted the party on arrival at the pine wood and later there was a snow shower. Conditions were, however, not rendered impossible, and the following species of Lepidoptera were observed, mostly in association with the Scots' pine and heather:—

Larvae of *Laspeyria flexula*, Schiff.; *Thera obeliscata*, Hb.; *Ellopiia fasciaria*, L. (*prosapiaria*, L.) and *Perconia strigillaria*, Hb.

Imagines of *Boarmia crepuscularia*, Hb.; *Pachynemias hippocastanaria*, Hb.; *Sarothrips revayana*, Tr.; *Dichonia* (*Xylocampa*) *areola*, Esp.; *Peronea ferrugana*, Schiff.; and *Gonepteryx rhamni*, L.

The usual pine-tree ladybirds were found in rather smaller

numbers than in the past. A series of the beetle *Dryocoetes villosus*, F. was taken from a pine stump and small fallen boughs of pine contained larvae, which proved to be those of *Ernobius mollis*, L. and *Ips laricis*, F.

Members devoting themselves entirely to searching for Coleoptera reported as follows:—

In drift by ditch, *Anchomenus ruficornis*, Goez. ; *Paederus litoralis*, Gr. ; and *Bembidion biguttatum*, F.

In moss on stumps, *Lathrobium terminatum*, Gr. ; *Xantholinus linearis*, Ol. ; *Conopalpus testaceus*, Ol.

In fungi on birch, *Bolitobius trinitatus*, Er.

Under pine bark, *Phloeopora testacea*, Mn.

Under decaying vegetation, *Agonum fuliginosum*, Pz. ; *Pterostichus nigrita*, F. ; *P. diligens*, St. ; and *P. minor*, Gy.

By beating, *Pogonochaerus hispidus*, L.

They also reported the following Hemiptera, *Gastrodes ferrugineus*, L. ; *Ischnorhynchus resedae*, Pz. ; and *Ledra aurita*, L. (a nymph).

After tea the shallows were visited, but very few insects were seen. Catkins were gathered by several members and, in addition to the usual *Xanthia* larvae contained an abundance of *Eupithecia tenuiata*, Hb. larvae.

23rd APRIL, 1936.

The PRESIDENT in the Chair.

Dr. Bull exhibited the Noctuid *Cosmophila sabulifera*, Gn. form *bipuncta*, Warr., taken at sugar, Goudhurst, Kent, in Sept. 1935. It is a native of N. Africa, Japan, Malay, etc. Other species of the genus are distributed around the globe.

Mr. Coote showed very varied series of *Triphaena fimbria*, L. and of *Maniola jurtina*, L. together with a dwarf example of *Lycaena arion*, L.

Mr. Eagles exhibited a fungus found on ling at Ockham, and said to be *Thelephora laciniata*, Pers., a species found in fir woods on stumps and on the ground, running up the stems of heather, etc.

Mr. Goodliffe exhibited a series of the grasshopper, *Stenobothrus parallelus*, Zett., and called attention to the considerable variation in colour among the specimens.

Mr. Stevens exhibited further species of Coleoptera from the Chatham district of Kent including *Sphodrus leucophthalmus*, L., *Helops coeruleus*, L., and *Cissophagus hederæ*, Schm.

Mr. Tomkins exhibited hibernated larvae of *Callimorpha quadripunctaria*, Pod. (*hera*, L.) from its old British locality, Dawlish.

Dr. Cockayne exhibited extreme aberrations of the Noctuids, *Agrotis cursoria*, Bork., *A. exclamationis*, L., *A. nigricans*, L., *A. cinerea*, Hb. and *Taeniocampa stabilis*, View. and read a short paper "A Contribution to the Genetics of *Monima incerta*, Hufn." (See Trans.)

Mr. C. N. Hawkins exhibited the hibernated larvae of *Ptychopoda aversata*, L. from Wimbledon, and some bred specimens of *Erannis* (*Hybernia*) *defoliaria*, Clrk., and read the following notes on his exhibit.

1. The hibernated larvae of *Ptychopoda aversata*, L. are from ova laid 3rd-4th July, 1935. These larvae hibernated in a large flower pot in the garden. The pot contained a dead plant of *Polygonum* and some growing grass and was covered with lino. After hibernation the larvae nibbled the dead stems of the *Polygonum*, ate some of the grass, and then Privet buds and finally took to *Crataegus* on which they became nearly full-grown. Most of the larvae from these ova pupated and the imagines emerged in Sept. last as a 2nd brood.

2. The *Erannis* (*Hybernia*) *defoliaria*, Clerk. are offspring of a pairing between a male ab. *obscura*, Dahlström, from Wimbledon, and a black female from one of the all-melanic broods of Chingford origin, the males of which were exhibited on 25.iv.1935.

The specimens shown comprise 3 non-melanic males of the form ab. *progressiva*, Haverkamp; 3 melanic ab. *obscura*, and 3 melanic ab. *progressiva*.

In connection with the latter exhibit, Mr. Hawkins read a short paper "Breeding Experiments with *Erannis defoliaria*, Clerk," dealing with some points in the breeding and genetics of the species. (See Trans.)

14th MAY, 1936.

The PRESIDENT in the Chair.

The President exhibited some South African Plant Galls.

1. TRYPETIDAE.—*Oedaspis maraisi*, Mro. on stems of *Othonna pallens*. *Afreutreta discoidalis*, Bez. on stems of *Vernonia anisochaetoides*. *Spathulina peringueyi*, Bez. on twigs of *Elytropappus rhinocerotis*. *Acanthiophilus hemimelas*, Bez. on twigs of *Brachylaena*

rotundata. *Trypanea lignoptera*, Mro. on twigs of *Berkleya magalies-montana*. *Parafreutreta conferta*, Bez. on stems of *Senecio angulatus*.

2. LEPIDOPTERA.—*Gelechia bletrias*, Meyr. on stems of *Solanum incanum*.

Dr. Bull reported the following species of Lepidoptera as having been observed in West Kent during the week-end 8th May to 12th May. *Drymonia chaonia*, Hb., *Notodonta ziczac*, L., *N. trepida*, Esp., *Pheosia tremula*, Cl., *Lophopteryx camelina*, L., *Pterostoma palpina*, L., *Cerura* (*Dicranura*) *vinula*, L., *Lithosia sororcula*, Hufn., *Pseudopanthera macularia*, L., *Lomaspilis marginata*, L. and *Lobophora halterata*, Hufn. (*hexapterata*, Schiff.). *Brephos notha*, Hb. was still flying and fresh specimens of *Monima* (*Taeniocampa*) *stabilis*, View. and *M. (T.) gothica*, L. were taken at light.

He then read the following note.

"I found a pupa of *Pieris rapae*, L. on the wall of my house at the beginning of April; it broke and several larvae fell out of the tail end. I put the rest of the pupa, packed tight with larvae, in a tin for observation. After a fortnight or so the other larvae emerged. They "rested" for another fortnight and then began to excrete, shrinking and then showing a black head and outlines of wing cases till in a week or so they were quite black. The first insect emerged about 5 days after." (Chalcid parasites *Pteronomus puparum*, L.—K.G.B.)

Dr. K. G. Blair exhibited :—*Polydrosus salsicola*, Fairm. and var. *insquamosus*, Everts. from N. Devon, only recently recognised in the British fauna; (2) *Corioxenos antestiae*, Blr. a new genus and species of Strepsiptera parasitic upon the Pentatomid bug *Antestia lineaticollis*, Stål. in Tanganyika. The material was collected by Mr. T. W. Kirkpatrick, F.R.E.S., who is much to be congratulated upon his success in securing all stages of the parasite, a most unusual occurrence in this group of parasites. (see "Proc. Roy. Ent. Soc." V, ser. B, pt. 6, 1936); and (3) insects of various orders collected at Aviemore in June, 1934 and 1935, including :—(Coleoptera) *Carabus glabratus*, Payk., *Gyrinus minutus*, F., *Triplax ruscicus*, L., *Dendrophagus crenatus*, Payk., *Trichius fasciatus*, L., *Elatér nigrinus*, Hbst., *Pogonochaerus fasciculatus*, DeG., *Zeugophora turneri*, Pow., *Xylita laevigata*, Ste., *Eremotes ater*, L., *Magdalis duplicatus*, Germ. (Diptera) *Tabanus sudeticus*, Zett., *T. cordiger*, Mg., *Therioptectes luridus*, Fln., *Xylophagus cinctus*, DeG., *Laphria flava*, L., *Rhadiurgus variabilis*, Zett., *Atherix ibis*, F., *Chrysotoxum arcuatum*, L., *Sericomyia lappona*, L., *Xylota florum*, F., and *Cephenomyia auribarbis*, L. (Hymenoptera) *Bombus lapponicus*, L., *Chrysis osmia*, Thoms.,

Spilocryptus saturniae, Boie., and *Ephialtes tuberculatus*, Fourc., a parasite of the weevil *Hylobius abietis*, L. (Lepidoptera) *Bupalus piniaria*, L., the ♂ with the typical white ground colour usual in the north but with three forms of the ♀; a dingy orange form approaching that of our southern counties, an almost uniformly blackish form, apparently ab. *fuscantaria*, Krulik., and the typical northern form with the central area only slightly yellower than in the male; also a pair of the southern form, ab. *flavescens*, B. White, for comparison.

Mr. Attwood exhibited—

1. Cast skin of an Adder from Benfleet, Essex. The skin was found between two stems of a Briar which had evidently been used for rubbing against to ease off the skin. He reported having found other skins at different times in similar positions.

2. Regurgitated pellet of Little Owl containing a large number of Coleopterous elytra from Benfleet, Essex.

Mr. H. W. Andrews exhibited a set of typical reference specimens of Diptera (Tachinids and Acalypterates) which he was placing in the Society's cabinet, and also a photograph of a chameleon in the act of taking food (Palestine, 1918).

Mr. R. A. R. Priske exhibited the shells of the British Molluscs *Helix aspersa*, Müll., *H. nemoralis*, L. and *H. hortensis*, Müll., from Littlehampton.

He then read the following note on the food of *Blaps* (Col.).

"I should like to offer a few notes arising out of an exhibit at the last meeting. One of our members brought up a beetle *Sphodrus*, which I said fed on *Blaps*. I don't think there is any doubt of this, but what *Blaps* feeds on I am doubtful. It has been said that it feeds on the deposits of rats. Prof. A. E. Boycott speaking on land molluscs says—"What they will feed on and what they do feed on are two different things."

"I live at Ealing and when we came there the part we moved to was an entirely new one, the house itself had only been built about a year and a lot of the land at the end of my road, which goes into the main Oxford road, has only been built on since the war. A hedge at the bottom of my garden was part of the boundary of Lee's Nursery now built over. The nursery came from Hammersmith and the name is enshrined in Thackeray's "Vanity Fair." Flowers were brought from Mr. Lee's nursery at Hammersmith. After being at this house a very few years, living things began to appear in the house. I found at different times female cockroaches walking

about with their protruding egg cases. Two kinds of house spiders appeared including the long legged *Tegenaria*, Walck., and the yellow slug *Limax flavus*, L., came out at night. My dog was barking so persistently one night that I had to go and see what was the matter and I found a fine specimen of the slug crawling about on the wall. Then *Blaps* appeared and I have found some half dozen at a time crawling on the kitchen floor at night. Were there sufficient rats in the foundations of this house to provide food for *Blaps*? And what did the *Limax* feed upon? Taylor in his Monograph, says that this is a voracious species, but he says, "In a state of nature, it is said to restrict itself to fungi and lichens." "It is said," so that we do not know. It would be interesting to know what these two species could find to feed upon in the basement of a house, also whence they came."

Mr. Priske also exhibited the shell of *Clausilia biplicata*, Monk., and read the following note:—

"I am exhibiting the shell *Clausilia biplicata* from Mortlake. I exhibited this some time ago and no doubt through my not providing a proper note, our Transactions said the shell was to be found on moss and on tree trunks. Of the two localities that I know, one is an old chalk pit in Essex, and the other at Mortlake is an old dry bank with very little cover. The animal seems very hardy, I have seen it active with frost on the ground, and also in some of the hottest and driest weather of the last few summers. Prof. A. E. Boycott in a paper on the habitats of land molluscs in Britain, gives *biplicata* in a list of species that "are certainly nearly always in calcareous places and I do not know of their having been found in habitats which, *on being tested*, proved to be non-calcareous." It is interesting to find that the shell is still found in the Mortlake locality."

Mr. Ashby showed a small collection of British Hemiptera taken by Dr. Joy and now presented to the Society's Cabinet.

Mr. Hutchins showed a specimen of the Early Spider Orchis, *Orphrys aranifera*, Huds. from Kent.

Mr. Coulson exhibited a large series of *Coccinella 10-punctata*, L., and of *C. bipunctata*, L., to show the extreme variation of the elytral markings of the two species, and illustrated his remarks by a series of diagrams. He also showed examples of *Euplectus sanguineus*, Den., and *Cephennium thoracicum*, Müll. (Col.) from Wimbledon Common.

Mr. Craufurd exhibited a banana-skin upon which ova had been laid; but the identity of the ova was not determined.

Mr. Turner exhibited three forms of the Cactus *Opuntia microdasys*, Lem. with areoles (spine-clusters) white, red and yellow respectively.

16th MAY, 1936.

FIELD MEETING—EAST HORSLEY.

Leader.—Dr. C. G. M. DE WORMS.

As a contrast to the meeting held at the corresponding season in 1935, glorious weather with brilliant sunshine greeted the small party, which assembled during the morning at East Horsley Station. These favourable conditions were maintained till the end of the day, when the numbers were augmented to just over twenty members, two of whom, Messrs. Mellows and Pooles, had travelled from Peterborough to attend the gathering. The Sheepleas had not been visited by the Society for many years and there was some speculation whether this locality still harboured many of its former choice and local insects. However expectations were soon fulfilled, as shortly after entering the Sheepleas by the church footpath the "Duke of Burgundy" *Hamearis (Nemeobius) lucina*, L., the desideratum of many visitors, made its appearance in fair numbers, though the females were not yet in evidence. *Callophrys rubi*, L., was also well on the wing as also were *Pyrgus (Hesperia) malvae*, L., and *Erynnis (Nisoniades) tages*, L. On the slopes of the Downs among the beech trees *Drepana cultraria*, Fb. was flying very freely about midday. Good series were obtained by several collectors, who were agile enough to net them when a gust of wind brought them low. During the afternoon a few of the party made their way to Netley Heath, which provided some quite profitable collecting. *Eupithecia tantillaria*, Bdv. (*pusillata*, Hb.) was swarming in a large spruce plantation, which also yielded a few *Thera variata*, Schiff., and plenty of *Ectropis consonaria*, Hb. Other species found on tree trunks included *E. crepuscularia*, Hb., *E. punctulata*, Schiff., *Cosymbia pendularia*, Clrck. and *C. punctaria*, L. A good many spring larvae were secured by searching and beating, among which were *Boarmia roboraria*, Schiff., *Philereme transversata*, Hufn. (*rhannata*, Schiff.), and *Nola cucullatella*, L. A small group of mullein plants were found to be smothered with ova of *Cucullia verbasci*, L., laid singly here and there on the underside of the leaves.

Other species of Macrolepidoptera seen during the day were *Pieris brassicae*, L., *P. rapae*, L., *P. napi*, L., *Euchloë cardamines*, L., *Argynnis euphrosyne*, L. (two), *Hipocrita jacobaeae*, L., *Ematurga atomaria*, L., *Chiasmia clathrata*, L. and *Bapta bimaculata*, Schiff. A varied and interesting amount of material in other Orders, in particular Coleoptera, was also obtained. A very welcome and liberal tea was provided at the Wellington Inn, East Horsley, and the gathering broke up about 7 p.m. after a very enjoyable and successful day.

24th MAY, 1936.

FIELD MEETING.—TILGATE FOREST.

Leader.—Mr. T. R. EAGLES.

Rainless days were none too frequent in the summer of 1936 and thus members, who attended the first meeting of recent years on this historic collecting ground, considered themselves fortunate in that one fell to their lot. The pedestrians took the path through the woods from Three Bridges to the Cinder Bank Bridge and returned by the same route. The motorists went viâ Crawley and Pease Pottage to the same spot. Fourteen members and three visitors attended.

Near the Cinder Bank Bridge there is some rather open ground where a number of butterflies were observed, including *Argynnis euphrosyne*, L. and some interesting varieties of *Erynnis tages*, L. and *Pyrgus (Hesperia) (Syrictus) malvae*, L. Several species of moths were observed such as *Bapta bimaculata*, Fb., *Gonospilera (Euclidia) mi*, Cl.; *Acrionicta leporina*, L.; *Boarmia punctinalis*, Scop. (*consortaria*, Hb.). On the birches in this area many larvae were found, among them *Hipparchus papilionaria*, L.; *Polyplocia flavicornis*, L.; *Brephos parthenias*, L., etc.

On the walk through the woods a plantation of spruce attracted attention. It was found to harbour the moths *Eupithecia tantillaria*, Bdv. (*pusillata*, Hb.); *Semiothisa liturata*, Clrck.; and *Thera obeliscata*, Hb. The first named was induced to fly in numbers by tapping the tree trunks or by touching the higher foliage with long poles. *Thera variata*, Schiff. was not found. Nearer Three Bridges *Euchloë cardamines*, L. was plentiful and eggs were found freely on *Barbarea vulgaris*, Br. (Hedge Mustard).

Oak stumps along the drive contained the early stages of

Synanthedon (Aegeria) vespiformis, L. By taking pupae and full fed larvae the moths were subsequently obtained with less difficulty than usual. A larva of *Laspeyria flexula*, Schiff. was beaten close by.

Of micro-lepidoptera the following were noted: *Ancylis uncana*, Hübn.; *Laspeyresia perlepidana*, Haw.; *Cnephasia incertana*, Treits.; *Salebria betulae*, Göze.; *Oxyptilus heterodactyla*, Vill.; and *Phlyctaenia prunalis*, Schiff. The first two were imagines, the remainder larvae.

Many species of Coleoptera were found; the most notable being *Rhizophagus aeneus*, Richt. This insect was under bark on the stump of a recently felled sweet-chestnut tree. The wood was still in a sappy condition, and several other species were there, including *Xyleborus dispar*, F. and *Librodor quadriguttatus*, F. The "tiger beetle," *Cicindela campestris*, L. was seen near the Cinder Bank Bridge. The recently recognized *Polydrosus pilosus*, Gredl. was beaten in the above spruce plantation.

28th MAY, 1936.

The PRESIDENT in the Chair.

Miss Beatrice Stigant, 175, Gloucester Place, N.W.1, was elected a member.

Mr. A. O'Farrell exhibited a gynandromorph of *Eudia (Saturnia) pavonia*, L. and said "It has the appearance of a normal ♀ at first sight. The antennae bear long hairs, quite like the normal ♂ antenna, though not quite so plumose in appearance. The genitalia are decidedly mixed. On the right hindwing are two orange streaks, both on vein 6 (presumably vestiges of ♂ coloration). This and two normal specimens, ♂ and ♀, were all bred from stock sent me from Wicken Fen by Mr. J. H. Stutter."

Mr. S. Ashby exhibited the local Coleopteron *Rhizophagus parallellocollis*, Gyll., from Chorley Wood, Herts, taken 11.v.36.

Dr. E. A. Cockayne exhibited preserved larvae of *Xanthia*, Och. and allied species and made remarks on their characteristics.

Dr. G. V. Bull exhibited (1) *Lasiocampa (Bombyx) quercus*, L. ♀ darker than the usual Southern form, bred from Cornish ♀ crossed with a Kent ♂. (2) An asymmetrical *Brenthis (Argynnis) euphrosyne*, L. (3) A miniature *Harmodia (Dianthoeicia) lepida*, Esp. (*carpophaga* Bork.) the size of *Miana strigilis*, Clerck. (4) A melanic form of *Boarmia punctinalis*, Scop. (*consortaria*, Hb.) bred from Bookham larvae. (5) Living larvae of *Itame wauaria*, L. (6) Parasites, *Apanteles* sp., bred from *Abraxas grossulariata*, L.

He reported the following dates of appearance: *B. euphrosyne*, L. 15.v.36; *B. selene*, Schiff., 20.v.36; *Hyloicus pinastri*, L., 24.v.36; *Palimpsestis* or, Fb., 25.v.36; and on 25.v.36 at Hod Hill, Dorset, *Euphydryas* (*Melitaea*) *aurinia*, Rott. and fourteen other species of Rhopalocera.

Mr. Hutchings exhibited the following British Orchids, *Habenaria bifolia*, R.Br., *Orchis purpurea*, Huds., *Ophrys muscifera*, Huds., *Neottia nidus-avis*, Rich., of Kentish origin except the last.

There was a short discussion on the genus *Xanthia*.

6th JUNE, 1936.

FIELD MEETING.—WARLEY COMMON.

Leader.—E. E. SYMS, F.R.E.S.

The visitors to Warley Common were favoured this year with excellent weather; 12 members and friends attended. During the morning most of them spent the time beating the trees, and from the remarks made at the tea-table, seemed to have secured a fair number of Lepidopterous larvae, but nothing new was added to the lists already published for the district. Early in the afternoon it was discovered that *Erastria venustula*, Hb. was resting upon the bracken stems and that by walking among them they were easily disturbed, they flew a short distance and came to rest upon another stem. If they were missed the first time they were soon put to flight again and capture was easy. Many of these insects were in perfect condition, apparently having emerged that day. Several members were successful in obtaining ova of this insect. Larvae of *Polyplocia ridens*, Fb. and *Drymonia chaonia*, Hb. were added to the list of Macros.

Mr. Wakely reported taking the following imagines: *Eucosma penkleriana*, Fisch., *Phalonia nana*, Haw., *Lobesia pernixtana*, Hb. and *Telphusa triparella*, Zell.

Dr. K. G. Blair reported the following species of Coleoptera: *Xylodrepa 4-pustulata*, L., *Megatoma undata*, L., *Athous hirtus*, Hbst., *Podabrus alpinus*, Payk., *Stenochorus meridianus*, Panz., *Balaninus glandium*, Marsh., and *B. villosus*, Fb.

11th JUNE, 1936.

The PRESIDENT in the Chair.

The special subject of the evening's meeting was an exhibit of living larvae. To this the following members contributed: Messrs. Bliss, Hawkins, Tompkins, O'Farrell, Eagles, Howard, and Grant.

Mr. Coulson exhibited the Coleoptera which he took at the Horsley Field Meeting on 16th May.

Mr. Stevens exhibited the rare Coleopteron *Langelandia anophthalma*, Aub. from the Chatham area.

Dr. Bull remarked upon finding ants devouring a specimen of *Brenthis (Argynnis) euphrosyne*, L.

Mr. Eagles exhibited living larvae of *Malacosoma neustria*, L., *Polyplocia ridens*, Fb., *Euchloë cardamines*, L. and *Xylomyges conspicillaris*, L.

Mr. Hy. J. Turner exhibited a very beautiful Theclid received recently from near Baños, Ecuador. The Theclids of S. America comprise a very large assemblage of small and medium sized species, most strikingly marked and coloured, which it has, hitherto, been found impossible to subdivide on satisfactory characters. The species shown was *Thecla coronata*, Hew. ♂ and ♀ of the most brilliant blue with 2 long tails on each hindwing.

He also showed, from the same area, a species of *Colias* taken at an elevation of between 5000 and 6000 ft. The species, *C. dimera*, Dbldy. and Hew., was sexually dimorphic. Only males had been sent and in these the fore-wings were bright orange and the hindwings clear yellow. Among those sent were two *C. lesbia*, Fb. a species native of the Argentine, to which country it was usually considered to be almost exclusively confined. So far he had been unable to find a previous record of it so far north as Ecuador.

Then he exhibited living larvae of *Boarmia rhomboidaria*, Schiff. feeding on garden jasmine at Cheam, all were very dark black brown but one, which was grey. The marking is in no way clear except on the lighter specimen. Buckler figures five, only one of which is dark brown but not a black brown. The light stripe on the under-side was mostly poorly represented. Also a coloured photograph of the larva of the large S. American Bombycid *Eacles imperialis*, Dry. with a ♂ imago of the same species.

On behalf of Dr. E. A. Cockayne, Mr. C. N. Hawkins exhibited larvae from Germany, of *Aplasta ononaria*, Fuess. and pointed out how unlike they are to any other British Geometrid larva. They are

short (about $\frac{1}{2}$ inch long), stout larvae with strong segmentation, considerably flattened dorso-ventrally, having long curved, white or white and black setae and a fairly dense clothing of short knobbed white secondary hairs. Under a strong lens the skin is seen to be covered with a number of fine, black spots (or ? points). The broadest part of the body is the 4th abdominal segment and they taper gradually thence in both directions.

They are various shades of olive green in colour and drop off the foodplant rather readily if alarmed.

Mr. Hawkins also showed larvae of *Lithosia lurideola*, Zinck. bred ab ovo and said "The parent was taken by Dr. E. A. Cockayne at Eynsford, Kent, on 13th July, 1935, and the ova hatched on 21st July, 1935. So far as I have been able to observe, these larvae have undergone 13 ecdyses but I suspect there have been others not noted. They have been difficult to deal with and are very subject to disease. The chief diet has been sallow in the autumn and bramble in the spring. Old or fairly old leaves of bramble seem best in the spring. Young sallow was readily eaten but proved fatal in most cases."

He finally exhibited an Ichneumonid Hyper-parasite, *Mesochorus fulgurans*, Curt. per *Casinaria vidua*, Grav. of *Abraxas grossulariata*, L. which he said had been bred that day from a Wimbledon larva and which he had observed to have the habit, when alarmed, of suddenly opening its wings to their fullest extent, pressing them flat on the surface upon which the insect is standing, and raising the abdomen at an angle of 45° or thereabouts to the resting surface. This attitude is taken up almost in a flash and after remaining thus for a short time (which varies) it returns in like manner to the normal position with the wings closed over the back.

Mr. H. B. Williams exhibited living larvae of *Euchloë cardamines*, L., full fed, from ova taken in Sussex, 16.v.1936; *Gonepteryx rhamni*, L., Wisley, Surrey; *Maniola jurtina*, L., with pupa, West Sussex; *Pararge aegeria*, in first instar; *Arctia caia*, L.; *Ophiussa* (*Toxocampa*) *pastinum*, Tr.; *Catocala nupta*, L. in first instar, and *Boarmia rhomboidaria*, Schiff.

Mr. O'Farrell exhibited larvae of *Poecilopsis lapponaria*, Bdv., *Endromis versicolor*, L. (Aviemore from wild ♀ ♀ in April), and *Polyphoca ridens*, Fb., *Psilura monacha*, L., and *Oenistis quadra*, L. beaten at Whitsun, 1936, in the New Forest.

14th JUNE, 1936.

FIELD MEETING.—BROADWATER FOREST.

Leader.—DR. G. V. BULL.

The Field Meeting at Broadwater Forest was held a week earlier than usual and was well attended. Thirty three (33) species of Macrolepidoptera were taken; the most interesting being a heavily blotched variety of *Brenthis selene*, Schiff., *Acronicta leporina*, L. *Thera firmata*, Hb. (for the first time at this meeting), *Hydriomena caerulata*, Fb. (*impluviata*, Hb.), and *Semiothisa notata*, L. Most of the species noted on previous occasions were also taken. Among the Microlepidoptera *Myelois neophanes*, Durr., *Argyrotoxa bergmanniana*, L., *Telphusa proximella*, Hb., *Ocnorostoma piniariella*, Z. and *Coleophora troglodytella*, Dup. were captured, the first and last of these in the larval stage, the former on *Daldinia concentrica*, a fungus on burnt birch trees, and the latter on *Inula dysenterica*, Gaert. The rare Alder Fly, *C. fuliginosus*, Pict. was also a pleasing discovery. A good many larvae were beaten including *Polyplocia flavicornis*, L., *Lasiocampa quercus*, L., *Brephos parthenias*, L. and *Demas coryli*, L.

The Coleoptera reported included the following: *Dacne bipustulata*, Thbg., *Agrilus angustulus*, Ill., *Elatер sanguinolentus*, Schr., *Microcara testacea*, L., *Saperda populnea*, L., *Cryptocephalus coryli*, L., *C. parvulus*, Müll., *Chrysomela goettingensis*, L., *Luperus longicornis*, F., *Galerucella viburni*, Payk., and *G. lineola*, F., *Orchestes rusci*, Hb.

Young stems of bracken, mined and contorted by the larvae of *Paltodora cytisella*, Curt. were noted plentiful in one spot, but attempts to rear the moth proved unsuccessful.

21st JUNE, 1936.

FIELD MEETING.—CUTT MILL.

Leader.—F. STANLEY SMITH, F.R.E.S.

This was a special event, as it was the first occasion, at any rate in recent years, on which the Society has had the pleasure of being entertained by a fellow-collector. The invitation of H. O. Holford, Esq., F.R.E.S., of Elstead, Surrey, led us to break ground new to the Society, and our host's garden and paddock proved not the least interesting part of it.

The weather prospects were certainly not bright, which was the more unfortunate as it had been necessary to book attendance in advance. After a night of tropical thunderstorms and with more thunder in the forecast, sunny intervals brightened a day that proved mostly dull and sultry, but no rain fell until the return journey was begun in the evening.

Eight members assembled at Guildford Station at 11.30 a.m. and proceeded by private omnibus via the Hog's Back and Seale to Cutt Mill cross roads. One unfortunate but enthusiastic member missed the train, and walked by road from Godalming to the ponds, so joining the main party when assembling en route for tea. Two others motored to the rendezvous, so getting in a longer day on the ground.

For the field work it was considered best simply to cover the promising terrain in the immediate vicinity of the ponds. This was sandy and boggy, covered with bracken or heather, with oaks and small birches, and old birch stumps and logs which proved attractive to the coleopterists. There was also a wet meadow on the fringe of the ground covered.

A young oak tree was noted with the trunk split throughout and, in fact, stripped of bark, slabs of which were scattered around. It had evidently been struck in the previous night's storm. The foliage however was unharmed, and an investigation of the insect life upon it showed its vigour unimpaired.

Numbers of larvae of *Sarothripus revayana*, Scop., were obtained, the smallest oak saplings with the most frost-bitten leaves yielding the largest numbers. Other interesting larvae from the oaks were *Drymonia chaonia* and *Ennomos erosaria*. The birches yielded a few *Drepana falcatoria* and *Polyphoca flavicornis*. In the wet meadow the heads of *Spiraea ulmaria* were infested with larvae of *Taeniocampa gracilis*, whilst *Plastenis subtusa* were found in the spun willow tips. Among lepidoptera in the perfect state *Diacrisia sannio*, *Ino statices*, *Hydrelia uncula*, *Aplecta tincta*, *Cybosia mesomella* and *Synanthedon spekeiformis* were taken. Among the Coleoptera, a very elusive species—*Tomoxia biguttata*, Gyll.—provided some excitement for those attempting to collect them and a good deal of amusement for those looking on.

At about 4.30 the party reassembled and proceeded by road and footpath to "Elstead Lodge" where lashings of welcome tea were hospitably provided by Mr. Holford. Afterwards our host showed us around his gardens and grounds, where various objects of interest

were found, and the discovery made that his asparagus beds were infested with the asparagus beetle, *Crioceris asparagi*, L., eggs, larvae and adults all being present. (Plate I.) Our well-meant efforts unfortunately did not clear the beds of the pest.

At 7.15 Dr. Blair moved a vote of thanks to Mr. Holford for his hospitality, and the party then returned by the same omnibus to Guildford Station via Shackleford and the new Guildford bye-pass.

As no list from this ground has been recorded previously in our Proceedings, contrary to our usual practice the following comprehensive list has been compiled from reports of members who attended :—

LEPIDOPTERA :—(Imagines) *Diacrisia sannio*, L., *Cybosia mesomella*, L., *Aplecta tincta*, Brk., *Plusia gamma*, L., *Hydrelia uncula*, Clrck., *Rivula sericealis*, Sc., *Ino statices*, L., *Synanthedon spheciformis*, Schiff., *Narycia melanella*, Hw., *Aristotelia tenebrella*, Hb., *Elachista kilmunella*, Stt. (Pupae), *Pammene regiana*, Zell. (Larvae), *Drymonia chaonia*, Hb., *Polyplocia flavicornis*, L., *P. ridens*, Fb., *Drepana falcataria*, L., *Demas coryli*, L., *Sarrothripus revayana*, Sc., *Panolis griseo-variegata*, Göze., *Taeniocampa gracilis*, Fb., *T. miniosa*, Fb., *Plastenis subtusa*, Fb., *Eupithecia abbreviata*, Steph., *E. dodoneata*, Gn., *Ennomos erosaria*, Schiff., *Biston strataria*, Hufn., *Peronea shepherdana*, Steph., *Tinea corticella*, Curt.

ODONATA :—*Calopteryx virgo*, L., *Ischnura elegans*, Lind., *Enallagma cyathigerum*, Charp.

COLEOPTERA :—*Melandrya caraboides*, L., *Tomoxia biguttata*, Gyll., *Crioceris asparagi*, L., *Synharmonia conglobata* L., *Dacne bipustulata*, Fb., *Porcinolus murinus*, Fb., *Prosternon holosericeus*, Fb., *Cantharis rufa*, Lin., *Rhagonycha lignosa*, Müll., *Malachius bipustulatus*, L., *Leiopus nebulosus*, L., *Luperus flavipes*, L., *Lochmaea capreae*, L., *Mycterus curculionides*, Fb., *Phyllobius pyri*, L., *Cryptocephalus parvulus*, Müll., *C. labiatus*, L., *Ditoma crenata*, Fb., *Dasytes aerosus*, Kies.

ORTHOPTERA :—*Ectobius lapponica*, L.

25th JUNE, 1936.

The PRESIDENT in the Chair.

Mr. A. Bliss exhibited a pupa of *Apatura iris*, L., of which the larva was beaten out last month on the Sussex border.

Mr. Wallis-Norton exhibited aberrations of *Hesperia* (*Syrichtus*)

malvae, L., with ab. *taras* Meig. and *Brenthis selene*, Schiff. with typical examples for comparison.

Mr. T. R. Eagles exhibited larvae of *Brephos notha*, Hb. and of *Pygaera curtula*, L. from Hoddesdon, Herts.

Mr. C. N. Hawkins exhibited the Coleoptera, *Clythra quadripunctata*, L. from Oxted, and *Leptura cerambyciformis*, Schr. from Chiddingfold.

Mr. Hy. J. Turner exhibited a series of the *Papilio* (Ornithoptera) *xalmoxis*, Hew. from Bitys, Ja River, Cameroons, W. Africa, of which he understood that the female had not yet been discovered. The males are of a beautiful dull blue with black veining and margins and measure about 6 ins. in expanse. He also called attention to an exhibit on 23rd April last by Dr. Bull of a Noctuid of the genus *Cosmophila* and exhibited several species of the same genus, *C. auragoides*, Gn., *C. fulvida*, Gn., and *C. (Anomis) erosa*, Hb. from Africa and India, Indo-Malay, and Central America respectively. Also he exhibited an intensely black *Euploea* species from New Guinea, *E. martini*, Nicé.; and larvae of *Xylina semibrunnea*, Haw. on ash: from Sussex. He then read an extract from a letter just received from Ecuador commenting on the *Thecla coronata*, Hew. exhibited at the last meeting, and remarking on the proportion of the sexes in the butterflies, and in this connection he showed an example of the scintillating Morpho, *M. sulskowskyi*, Koll. ssp. *sirene*, Niep. from the above locality and of which only 5 ♀s had been captured to about 250 ♂s.

A short discussion took place on the proportion of the sexes in insects.

Mr. R. A. R. Priske exhibited large and small specimens of the shells of the Mollusc, *Helix aspersa*, Müll. and of the Coleoptera *Geotrupes typhaeus*, L. and *G. spiniger*, Marsh. and read the following note:—"I found a very dwarf specimen of *Helix aspersa*, Müll. which gave me the idea of a small exhibit. I have put by its side a large form from Eastbourne and I have put for comparison two corresponding forms of the beetles *Geotrupes typhaeus*, L. and *G. spiniger*, Marsh. It is not easy to say what causes these differences in size. The small shell may have been caused by some disease or parasite—in the beetles it may have been due to insufficient food—it would be interesting to know if dwarf races could be obtained from these animals. Such differences in size of course may be found in all living things.

"In dogs we have such races as say a mastiff and a Cairn terrier.

We find tall and dwarf races in man. Without wishing to trespass upon the domain of the physician or the physiologist I would point out that in ourselves, as in the shell, we have dwarfism and giantism—in our case supposed to be caused by aberrations of the pituitary gland. Some authorities like Sir Arthur Keith think that the ductless glands such as this and the thyroid have been factors in the evolution of race.”

Short Interim Reports of Field Meetings were made by the various leaders.

28th JUNE, 1936.

FIELD MEETING—NEW FOREST.

Leader.—S. WAKELY.

According to the syllabus, Box Hill was to have been the rendezvous for this date. Owing to the Southern Railway running a very convenient excursion to the New Forest, it was unanimously decided to change the fixture to this historic collecting ground. The main party went from Waterloo to Brockenhurst, where they were met by several members staying in the locality in addition to one visitor from the Isle of Wight. After proceeding together across Balmer Lawn, the party split up, Denny enclosure, Stubby Copse, and the railway bank being explored. The weather was perfect, and the large Fritillaries were soon observed, together with the White Admiral gliding around the trees with its characteristic graceful flight. One fine Hornet was also seen but not captured.

The following is a list of insects reported as taken :

LEPIDOPTERA.—Imagines: *Argynnis paphia*, Linn., *A. adippe*, Linn., *A. aglaia*, Linn., *A. euphrosyne*, Linn., *A. selene*, Schiff., *Limentis camilla*, L., (*sibilla*, Linn.), *Pararge aegeria*, Linn., *Maniola* (*Epinephele*) *jurtina*, L., (*janira*, Linn.), *Coenonympha pamphilus*, Linn., *Plebeius* (*Lycaena*) *argus*, L. (*aegon*, Schiff.), *Polyommatus icarus*, Rott., *Gonepteryx rhamni*, Linn., *Ochlodes* (*Pamphila*) *venata*, B. & G. (*sylvanus*, Esp.), *Pyrgus* (*Hesperia*) *malvae*, Linn., *Cybosia mesomella*, Linn., *Diacrisia sannio*, Linn. (*russula*, Linn.), *Gonospileira* (*Euclidia*) *mi*, Clereck., *Erastria fasciana*, Linn., *Ptychopoda subsericeata*, Haw., *P. aversata*, Linn., *Chiasmia* (*Semiothisa*) *clathrata*, Linn., *Perconia* (*Crocata*) *strigillaria*, Hübn., *Zygaena trifolii*, Esp. Larvae: *Sarrothripis revayana*, Scop., *Polyphoca flavicornis*, Linn.,

P. ridens, Fabr., *Evetria buoliana*, Schiff., *Eucosma immundana*, Fisch. v. Rösl.

DIPTERA.—Tabanidae: *Tabanus sudeticus*, Zeller, *T. bromius*, L., *T. maculicornis*, Zell., *Therioptectes tropicus*, L., *T. solstitialis*, Mg., *T. distinguendus*, Verr., *Chrysops caecutiens*, L., *C. quadratus*, Mg., *Chrysozona pluvialis*, L.

In Coleoptera nothing of particular note was recorded.

4th JULY, 1936.

FIELD MEETING—CHALFONT ROAD.

Leader.—DR. K. G. BLAIR.

The insects specially sought for were *Discoloxia blomeri*, Curt. and *Abraxas sylvata*, Scop., but of these the former was not seen, unless represented by certain small Geometrae that flew off from the tree trunks on approach, while the latter was present in very limited numbers. Their fresh condition suggested that in this late season we were a little too early. Amongst other captures a very fine bleached specimen of *Maniola jurtina*, L. fell to Mr. Wakely, while *Cosymbia trilinearia*, Borkh., *Campaea margaritata*, L., *Lathronympha hypericana*, Hb. and *Telphusa vulgella*, Hb. were also taken. Larvae included *Dianthoecia bicruris*, Hfn., (*capsincola*, Hb.), *Cucullia verbasci*, L., *Europtula badiata*, Hb., *Calocalpe cervinalis* (*certata*, Hb.) and *Coleophora limosipennella*, Dup. Of Coleoptera the best captures were *Malachius marginellus*, Ol. and *Amalus haemorrhous*, Herbst. Some cocoons of *Cionus scrophulariae*, L. produced nothing but a lusty brood of Chalcid parasites, determined by Dr. Ferrière as *Entedon euphorion*, Walk., of which *E. cioni*, Thoms.* is probably only a variety. Larvae of *Hypera polygona*, L. were found on *Silene inflata*, Sm.

Only five members were present. Tea was very welcome at a cottage near Latimer.

* The typical form of this species, also determined by Dr. Ferrière, was bred by me from cocoons of *Cionus thapsus*, F. taken on the Box Hill Field Meeting, 1931.—K.G.B.

8th JULY, 1936.

The PRESIDENT in the Chair.

Mr. Jacobs exhibited leaves of Lombardy Poplar mined by larvae of *Phyllocnistis saligna*, Zell., showing larvae feeding and the slight

curling of the leaf edge where the cocoon is spun. The mine consists of a separation of the epidermis from the parenchyma without much sign of feeding and no frass. The larva feeds on front and back of leaf impartially. The pupa has a curious caudal armature consisting of two lamellate projections pointing rearwards from the sides of the anal segment.

Dr. K. G. Blair exhibited living larvae of *Papilio machaon*, L. in 3 stages, from Wicken Fen, 28th June, and a living Cassidid beetle, *Aspidomorpha delitescens*, Wse., sent by Mr. J. G. Williams from Dowa, Nyassaland, on 6th June.

Mr. T. R. Eagles exhibited Coleoptera taken at the Field Meeting at Cutt Mill, Surrey, including *Crioceris asparagi*, L. ; *Tomoxia biguttatus*, Gyll. and *Melandrya caraboides*, L. He also exhibited imagines of the moth *Scardia boleti*, Fb. reared in abundance from an Ascomycete fungus growing on oak ; larvae of *Erastria venustula*, Hb. from ova laid by a ♀ taken on Warley Common by Mr. S. Wakely, and pointed out that the caterpillar has a humped appearance due to the first four segments being higher and wider than the others ; larvae of *Ennomos erosaria*, Schiff., taken during the Field Meeting at Cutt Mill, from a tree which had been struck by lightning, and being reared to see if any abnormality in the imago is noticeable.

Mr. C. N. Hawkins exhibited four specimens (2 males and 2 females) of *Cepphis advenaria*, Hb. bred ab ovo in May last, and said :—"Both parents were the offspring of a female taken by Mr. S. Wakely in the New Forest in 1934. Mr. Wakely obtained the pairing and very kindly gave me some of the resultant ova. He states that both parents and the female grandparent were normal, the male grandparent is unknown. These four examples are strongly banded and rather dark. They are probably referable to ab. *fasciata*, Schwngns. Other specimens which I bred were about normal and the facts suggest that the form now shown is a recessive. I tried to get a pairing of the variety but failed. Four captured normal specimens from Limpsfield are also shown for comparison."

Dr. G. V. Bull exhibited a short series of *Agrotis ripae*, Hb. from Sandwich with specimens from Norfolk, Devon and Lancashire for comparison ; also the Caddis-fly *Phryganea grandis* L. ; and a ♀ *Cosmotriche potatoria*, L. hatched on the morning of 5th July in a 10" × 10" × 14" cage with perforated zinc sides. He said "I killed her in the afternoon and at 11 p.m. a ♂ came quietly in, not dashing all over the place as when coming to light, but seeking purposefully for something."

Mr. Howard exhibited imagines of *Macrothylacia rubi*, L. and of *Chloroclystis rectangulata*, L. together with a life-history of *Aegeria (Trochilium) apiformis*, Clrck.

Dr. Bull then communicated the following short report on the Oxford Congress of the S.E. Union of Scientific Societies in July at which he was the Society's representative.

"On the afternoon of July 2nd the Zoological section of the Conference visited Cothill, the botanists and ornithologists being in the majority; both were apparently satisfied with the outing and 31 different birds were noted chiefly by their songs. The weather was showery and Lepidoptera were not abundant. *Callimorpha dominula*, L. was seen and one specimen of *Toxocampa pastinum*, Tr. was taken and one of *Phalaena syringaria*, L.: 18 species in all being listed. A specimen of the Dipteron, *Isopogon brevirostris*, Mg. was secured, its captor having hitherto only taken it north of the Tweed.

"In the evening an informal reception was held by Dr. and Mrs. Carpenter and we were entertained at intervals by the Bodley Singers, a male quartette.

"The morning of July 3rd was taken up by short lectures on the aims of the Bureau of Animal Population and the British Trust for Ornithology, "Bird Ringing and Bird Migration," by the Rt. Hon. the Earl of Mansfield and, "Wild Life at the Farne Islands," and a film of the Grey Seal by T. Russell Goddard, F.L.S.

"In the afternoon there were excursions to Godstow and Wytham Woods and a trip through some of the Cotswold villages. The latter was accompanied by Mr. Baker who at intervals explained the chief features of interest.

"In the evening a lecture was given on Ruwenzori and the Mountains of the Moon by Dr. F. W. Edwards of the British Museum (Nat. Hist.).

"The morning of July 4th the annual business meeting was held, the balance sheet showed a debit balance of some £3 10s. Od., and there was a good deal of unprofitable discussion as to the best means of increasing the income of the Union. The meeting closed with votes of thanks to the University Authorities and all who had helped to make the Conference a success."

12th JULY, 1936.

FIELD MEETING—SOUTH BENFLEET, ESSEX.

Leader.—R. W. ATTWOOD.

Seven members attended, and in spite of the curtailment of the afternoon collecting due to rain, managed to secure a considerable number of insects.

Thanks to the good offices of Mr. Wallis-Norton, who came by car, it was possible for some of the members to include a trip to the locality where *Melitaea athalia*, Rott. occurs. They were more abundant than usual but rather worn. Owing to their numbers, however, it was possible to select a good series. The females were in much better condition than the males, which tends to support the opinion of the local collectors that the main emergence of the female is at least a week later than the male. A fully grown larva was found. Unfortunately this area is scheduled for building purposes and in spite of great efforts to preserve it, it seems as though the builders will have their way.

Several local Entomologists are, therefore, endeavouring to establish a colony of this butterfly elsewhere in the hope of preserving the species in Essex.

The remainder of the party had in the meantime proceeded to the sea wall. *Adopoea lineola*, Ochs., were not so abundant as usual, but possibly the strong breeze prevented them from flying freely. Ova and larvae of *Euchloris smaragdaria*, Fb. were found on sea wormwood, but the larvae were very small. The larvae and pupae of the Plume Moth, *Agdistis bennettii*, Curt. were taken on the sea lavender and imagoes of the Tineid, *Goniodoma limoniella*, Stt. were also seen. *Satyrus* (*Melanargia*) *galathea*, L. and *Aphantopus hyperantus*, L. were common and in very fine condition but *Maniola* (*Epinephele*) *tithonus*, L. were only just emerging.

The beetles were not specially worked for, but a specimen of *Baris scolopacea*, Germ. was taken on the sea wall and it is interesting to record that Mr. Wakely bred a specimen from a larva found feeding in the stem of *Atriplex littoralis*, L. gathered in the same locality. The larva of one of the *Cassida* beetles was also found feeding on *Atriplex portulacoides*, L.

On the *athalia* ground a number of egg cases of the beetle, *Attelabus nitens*, Scop. (*curculionides*, F.), were noted on the leaves of the Spanish chestnut. The leaves were eaten through to the midrib and the tips of the leaves were then folded over. The wilted

ends of the leaves make the egg cases of the beetles very conspicuous. The beetle was also seen but was very timid and fell directly the leaves were touched.

The grasshopper, *Metrioptera roeselii*, Hagb., was captured, but no specimens of the winged form were noted. *Conocephalus dorsalis*, Latr. was also taken.

The wind made it difficult to capture the Dragon Flies of which a number were seen, including the local species *Lestes dryas*, Kby.

Owing to the threatening aspect of the weather the party was not able to work the rough slopes of the hill-side, and it was deemed advisable to get nearer shelter.

The following is a list of the other insects noted :—

LEPIDOPTERA.—*Xylophasia lithoxylea*, Fb., *Polia* (*Melanchra*) *serena*, Fb., *Calostigia* (*Eustrotia*) *viridaria*, Fb., *Ptychopoda fuscovenosa*, Göz., *Eupithecia subnotata*, Hb., *Angerona prunaria*, L., *Aglais* (*Vanessa*) *urticae*, L., *Limenitis camilla*, L. (*sibilla*, L.), *Heodes* (*Chrysophanus*) *phlaeas*, L., *Adopoea thaumas*, Hufn., *Angiades sylvanus*, Esp. = *venata*, *Phalonia hybridella*, Hb., *Eucosma citrana*, Hb., *Eucosma brunnichiana*, Fröl., *Eucosma foenella*, L. (pupa), *Hemimene petiverella*, L., *Coleophora conspicuella*, Zell.

23rd JULY, 1936.

Mr. E. E. SYMS. F.R.E.S., VICE-PRESIDENT, in the Chair.

Dr. Blair exhibited living larvae of *Dipterygia scabriuscula*, L. bred ab ovo, from Hendon.

Mr. Bunnnett exhibited photographs showing the life-history of the beetle *Crioceris asparagi*, L. from material obtained at Cutt Mill.

Mr. T. R. Eagles exhibited a series of *Eupithecia dodoneata*, Gn., bred from larvae taken at the Bookham Field Meeting in 1935, also cocoons of the Neuropteran *Conwentzia psociformis*, Cur. He also showed the form of *Eupatorium cannabinum*, L. with white flowers.

Mr. Wallis-Norton exhibited larvae of *Euchloris smaragdaria*, Fb.

Mr. H. Moore exhibited a mayfly he had kept alive for 13 days, and a Dipteran from Broadwater Forest said to be a parasite on various species of Ichneumon.

Mr. C. N. Hawkins exhibited :—

1. On behalf of Mr. S. Wakely, who was unable to be present, two nearly full-fed larvae of *Monodes* (*Erastria*) *venustula*, Hb. bred from eggs laid by a female taken at the Warley Common Field

Meeting on 6th June. (For foodplants used by Mr. Wakely in rearing these larvae, reference should be made to his note in "The Entomologist," Vol. LXX., Jan., 1937, p. 15.)

2. Two young larvae (about $\frac{5}{8}$ inch long) of *Mimas tiliae*, L. beaten from two separate Birch trees at Box Hill yesterday, and said:—"Both trees were small ones, situated on the open hill-side and there were no Lime or Elm trees near. In the first case I also found the empty egg shell laid on the underside of a Birch leaf near where I beat the larva. (See also the note by Mr. Hawkins in the Proceedings for 24th Sept. post.) Tutt in his "British Lepidoptera" quotes Dollman as an authority for this species being found on Birch and I understand another member of this Society has also beaten it from Birch but I think the occurrence is sufficiently rare to make it worth recording. At any rate I have beaten thousands of Birches, in many places, without ever coming across such a case before."

Mr Eagles reported that from an ovum found on a birch in his garden he had reared an example of *Mimas tilia*, L. Elm and lime were in the garden and a number of elms in the road near by.

Mr. T. G. Howarth reported that four years ago at Muswell Hill he found a full grown larva of *Mimas tiliae*, L. feeding on birch and two years ago at Oxshott, Surrey, found two more on one birch tree. One was in its last instar and the other about half grown.

Dr. E. A. Cockayne exhibited a specimen of the extremely local Hemipteron *Cicadetta montana*, Scop. taken on June 20th in a wood near Chiddingfold, Surrey. In the monograph published by the Ray Society it is said to be confined to the New Forest, where it is local, apart from a single specimen taken in a wood near Haslemere by the late C. G. Barrett.

Mr. Attwood exhibited cocoons of a *Cionus* beetle on Figwort, which bear a striking semblance to the seed pods of the foodplant, from the Chalfont Rd. Field Meeting in July. Also leaves of Spanish chestnut folded by the beetle *Attelabus nitens*, Scop. (*curculionides*, L.), from the Benfleet Field Meeting in July.

Mr. Hy. J. Turner exhibited short series of *Doritis apollinus*, Hbst. and read the following note.

"A few weeks ago I received a specimen of *Doritis apollinus*, Hbst. from Mesopotamia taken in March last. On comparing it with others I found that it was the lightest example I had and probably was of the form *apollinaris*, Stdgr. (*pallidior*, Splr.) The genus *Doritis* is monotypical and closely related to the genus *Parnassius* of which

apollo, L. is the typical species. *D. apollinus* occurs in Asia Minor, Syria, Mesopotamia, etc. In the series are f. *amasina*, Stgr. distinguished by the large discoidal on the hindwing; f. *bellargus*, Stgr. especially distinguished by strong and intensified colouring."

Also in the box were two examples of *Colias ladakensis*, Fldr. taken in the Himalayan region at about 1300 ft. elevation. Mr. Turner said he was indebted to Commander J. J. Walker for these two examples.

Mr. Dennis, on behalf of Mr. Turner, exhibited examples of an *Orobanche*, subsequently identified as *O.* which grew up every year under a bush of *Buddleia globosa*.

Mr. Jacobs exhibited imago and cocoons of *Yponomeuta vigintipunctatus*, Retz. and asked for suggestions as to how the larval skin was left well outside the fusiform cocoon, which is drawn to a point both anteriorly and posteriorly so as to defy admission from either end.

Mr. E. P. Wiltshire exhibited various species of Heterocera including *Cosmia (Xanthia) ocellaris*, Bork. f. *palleago*, Hb. from Syria, with *Amathes lastiflora*, n. sp. and *Cucullia scrophulariae*, Cap. from Europe.

Mr. Coote exhibited a full grown larva, the ova and a dead ♀ of *Lymantria monacha*, L.

Mr. Attwood then communicated a preliminary report of the Field Meeting held at Benfleet on 12th July, 1936.

Mr. Priske gave details of a snail, *Helix aspersa*, Müll., which had lived 9 months in a closed tin box.

25th JULY, 1936.

FIELD MEETING.—ASSTEAD AND EPSOM COMMONS.

Leader.—M. NIBLETT

Asstead Woods were first worked in the morning in bright sunshine, but heavy showers soon made the vegetation very wet; the rain ceasing, members of the party carried on and after lunch proceeded in the direction of Epsom across the common. Rain eventually put a stop to operations, but a number of insects were seen or taken as the following list shows. Six members were present.

LEPIDOPTERA:—*Limenitis camilla*, L., *Argynnis adippe*, L., *A. paphia*, L., *Adopoea flava*, Brn. (*linea*, Schiff.) (*thaumas*, Hufn.), *Maniola tithonus*, L., *M. jurtina*, L. (a light form), *Aphantopus*

hyperantus L., *Apamea secalis*, L. (*didyma*, Esp.), *Endotricha flammealis*, Schiff., *Synaphe angustalis*, Schiff., *Crambus pratellus*, L., *Platyptilia pallidactyla*, Haw. (*bertrami*, Rössl.), *Carcina quercana*, Fb., *Telphusa luculella*, Hb., *Chirocompa lunaris*, Haw.

DIPTERA:—*Xyphosia miliaria*, Schn., *Orellia ruficauda*, Fb., (and larvae), *O. tussilaginis*, Fb., *Ensina sonchi*, L.

HOMOPTERA:—*Philaenus lineatus*, L., *Tettigonia viridis*, L., *Megophthalmus scanicus*, Fall.

HETEROPTERA:—*Myrmus miriformis*, Fall., *Metacanthus elegans*, Burm.

COLEOPTERA:—*Malthinus fasciatus*, Ol., *Crepidodera transversa*, Marsh., *Anaspis subtestacea*, Steph., *Coeliodes erythrolencus*, Gmel., *C. rubicundus*, Hbst., *Ceuthorhynchus litura*, Fb., *Orchestes avellanae*, Don., *O. rusci*, Hbst., *O. stigma*, Germ.

PLANT GALLS:—(*Cynipidae*): *Neuroterus lenticularis*, Oli., *N. numismatis*, Oli., *N. fumipennis*, Htg., *Andricus curvator*, Htg., *A. solitarius*, May., *A. fecundatrix*, Htg., *A. ostreus*, Htg., *Rhodites rosae*, Htg., *R. eglanteriae*, Htg., *Liposthenus latreillei*, Kieff. (*Trypetidae*): *Urophora cardui*, L. (*Cecidomyiidae*): *Rhabdophaga salicis*, Schrnk., *Hartigiola annulipes*, Hart., *Trotteria umbelliferarum*, Hart., *Jaapiella veronicae*, Vallot., *Iteomyia major*, Kief., *Schizomyia galiorum*, Kief., *Oligotrophus bursarius*, Bremi. (*Eriophyidae*): *Eriophyes similis*, Nal., *E. goniothorax*, Nal. (*Anthomyiidae*): *Anthomyia signata*, Briske.

9th AUGUST, 1936.

FIELD MEETING—GOMSHALL, SURREY.

Leader.—F. D. COOTE.

Eight members and one visitor met at Gomshall in the morning for this meeting. The weather, for a change, was sunny, though later in the day becoming sultry and not conducive to strenuous work. On the way from Gomshall Station the party worked the marshy common south of the main road for a short time and then proceeded by a rough lane, bordered by broad and high hedges of mixed bushes and creepers to Hackhurst Down. Part of the hill side belongs to the National Trust and is dotted with Juniper bushes, the corner near Gomshall Station being thickly carpeted with flowers. Here *Lysandra* (*Polyommatus*) *coridon*, Pod., was very plentiful and in excellent condition. *Hesperia comma*, L., were fairly numerous

and mostly freshly emerged. Other butterflies observed either singly or only a few were *Gonepteryx rhamni*, L., *Aglais urticae*, L., *Polygonia c-album*, L., *Aricia agestis*, Schiff. (medon, Hufn.), *Polyommatus icarus*, Rott., *Lycaenopsis argiolus*, L., *Eumenis semele*, L., *Pararge aegeria*, L., *Maniola tithonus*, L., *Aphantopus hyperantus*, L., and *Chrysophanus (Heodes) phlaeas*, L. *Maniola jurtina*, L., was of course abundant, several light forms being observed. One member reported having seen *Vanessa cardui*, L. A few *Ortholitha (Xanthorhoe) bipunctaria*, L. and *Zygaena filipendulae*, L. were seen.

Mr. F. J. Coulson has furnished a list of Coleoptera and Rhynchota taken by him.

In addition to the usual Chalk flora, *Campanula glomerata*, L., and *Gentiana campestris*, L. were abundant in the flowery corner mentioned above and *Phyteuma orbiculare*, L. was beginning to flower.

After working Hackhurst Down, members climbed the hill to the Drove between Ranmore and Netley Heath, but captures there were rather few.

A very enjoyable tea was served in the attractive garden of the Bournside Tea Gardens, in Gomshall.

COLEOPTERA:—(1) Waste ground adjacent to roadway by Gomshall. *Stenus bimaculatus*, Gyll., *S. speculator*, Lac., *S. flavipes*, Steph., and *S. tarsalis*, Ljun., *Lema puncticollis*, Curt., *Phaedon cochleariae*, F., *Pria dulcamarae*, Scop., *Crepidodera transversa*, Marsh., and *C. ferruginea*, Scop.

(2) In lane (including chalk pit at the end of the lane.) *Phytomus variabilis*, Hbst. and *P. trilineatus*, Marsh, *Sitona hispidulus*, F., and *S. lineatus*, L., *Ceuthorrhynchus pleurostigma*, Marsh, and *C. rugulosus*, Hrbst. sweeping in lane; *Trechus quadristriatus*, Schrnk., *Corticaria crenulata*, Gyll., *Astenus angustatus*, Pk. and *Stenus picipes*, Steph., in dried grass heap; sweeping in the chalk pit, etc., *Apion seniculum*, Kirb., *A. simile*, Kirb., *A. waltoni*, Steph. and *A. loti*, Kirb.

(3) A. General sweeping on the downs—Hackhurst Common, *Cryptocephalus bilineatus*, L. (with var. *armeniacus*, Fald.), and *C. fulvus*, Goez., *Aphthona atrovirens*, Frst., *Chaetocnema hortensis*, Fourc., *Orchestes pratensis*, Germ., *Micrelus ericae*, Gyll., *Sphaeroderma rubidum*, Graells., *Bradycellus verbasci*, Duft., *Cyrtanotus aulica*, Panz. and numerous other species.

B. Beating oak in wood. *Scymnus auritus*, Thnb. on *Hypericum*; *Chrysolina hyperici*, Forst, was abundant; a well marked aberration of *Strangalia maculata*, Pod. occurred on the brambles in a ride in the wood and here also *Rhinoncus castor*, F. and *Cassida flaveola*, Thnb. were swept.

RYNCHOTA:—*Homoptera*:—*Tettigonia viridis*, L., several forms of *Philaenus spumarius*, L., *Philaenus campestris*, Fall., *Conomelus limbatus*, Fb. were frequent, and *Agallia venosa*, Fall. and many others of the *Homoptera* also occurred.

Heteroptera:—*Monanthia cardui*, L. occurred in abundance on thistle; *Stenotus binotatus*, Fb., *Calocoris roseomaculatus*, de G., *Myrmus miriformis*, Fall., *Pithanus maerkeli*, H.-S., and *Capsus ruber*, L. were common: many other species were observed.

HYMENOPTERA:—On Hackhurst Down—ants of the species *Myrmica scabrinodis*, Nyl. were in numbers

13th AUGUST, 1936.

Mr. F. J. COULSON, VICE-PRESIDENT, in the Chair.

It was announced that Mr. A. E. Tonge, the Treasurer of the Society for many years, had presented to the Society the collection of lantern slides made by the late Dr. T. A. Chapman.

Dr. de Worms exhibited the larvae of *Papilio machaon*, L. and of *Earias chlorana*, L. from the Norfolk Broads and larvae of *Moma* (*Diphthera*) *alpium*, Osb. (*orion*, Esp.), and *Harmodia* (*Dianthoecia*) *albinacula*, Bork. from Kent; larvae of *Cucullia lychnitis*, Rmbr. from Bucks, etc.

Mr. Bunnett exhibited some very fine photos of the larva of *Stauropus fagi*, L. taken at different stages of its development.

Mr. Eagles exhibited larvae of *Plagodis dolabraria*, L. from Epping.

Dr. K. G. Blair exhibited the following:—(1) A specimen of the dragonfly *Agrion pulchellum*, Lind. near the base of the left forewing of which was attached a midge, *Pterobosca paludis*, Macfie (1936 "Proc. R. Ent. Soc." 5, p. 62). A number of dragonflies that were attacked in this way were taken in Wicken Fen on the occasion of the visit of the Congress of the Society for British Entomology on 28th June last. (See also Cowley, "Entom." 1936, p. 150.)

(2) *Leptosia fasciata*, Mg., a rare Tachinid fly, from Longdown, near Princes Risborough, taken on 3rd August. ("Ent. Mo. Mag." 1913.)

(3) The Chalcid *Entedon euphorion*, Walk. bred by Mr. Harry Moore from cocoons of the weevil *Cionus scrophulariae*, L., collected at the Field Meeting at Chalfont Road on 4th July. This is of interest as being the first occasion this species has been associated

with any host, although *E. cioni*, Thoms., bred by me from *C. thapsus*, F. from Box Hill, is considered by Dr. Ch. Ferrière, to whom I am indebted for the determinations, to be only a variety of the same species.

Dr. G. V. Bull exhibited a very beautiful example of the green form of the larvae of *Eumorpha* (*Chaerocampa*) *elpenor*, L. from Sussex, and of *Colocasia* (*Demas*) *coryli*, L. from Aviemore, also a large Tabanid fly *Tabanus sudeticus*, Zett. ♂ found on a post at Aviemore at night.

Mr. Howard exhibited forms of British Geometers including a melanic form of *Thera obeliscata*, Hb. with all markings obsolescent.

Mr. Hawkins exhibited, on behalf of Mr. Ennis, examples of the highly spotted form of the larvae of *Amorpha populi*, L.

Mr. Coulson exhibited Coleoptera taken in the Shetlands by Miss Kirby including *Lesteva monticola*, Kies., *Athous subfuscus*, Steph. and *Apion reyi*, Desbr.

Mr. Coote gave a preliminary report of the recent Field Meeting at Gomshall and Hackhurst Downs.

27th AUGUST, 1936.

The PRESIDENT in the Chair.

Mr. S. N. A. Jacobs exhibited the flower-heads of *Alopecurus myosuroides*, Huds. (Slender Foxtail or Black grass) bearing the bodies of several small Syrphid flies, Ditchling, Sussex, 18.viii.36, and said:—"This plant was on the borderland of a mangold field, and stood under an oak tree. There were about six flower spikes, each of them bearing at least six of these flies. The specimens shown were carried away in the buttonhole of my jacket and some of the flies had become detached before a suitable box was available.

"There was, as far as I could see, no "honeydew" in any great quantity to attract the flies to the grass heads, and an explanation of their presence would be welcome."

(They were probably victims of an entomophagous fungus.—K.G.B.)

Mr. Priske exhibited a series of aberrations of the garden snail *Helix aspersa*, Müll.

Mr. H. Moore exhibited the Nymphalid *Colaenis julia*, Fb. ssp. *delila*, Fb., an American butterfly with distribution ranging from

Texas to Paraguay, taken alive in a fruiterer's shop in Rotherhithe. Probably it was imported with bananas from Jamaica. Also the seed-heads of *Malva moschata*, L., var. *albiflora* from West Hanningfield, Essex.

Mr. Syms exhibited a specimen of the British Bee, *Osmia bicolor*, Schr. taken from a snail's shell. This is unusual at this time of the year as the larva as a rule rests until the spring before pupation takes place.

Mr. Coulson exhibited Coleoptera that he had taken during the Field Meeting at Gomshall.

Mr. Stevens exhibited numerous species of Coleoptera from the Chatham district.

Mr. Attwood exhibited the beetle *Cassida rubiginosa*, Müll. bred from larvae found on a Plume Thistle, *Carduus* (*Cnicus*) sp. at Benfleet.

Mr. S. Wakely exhibited specimens of *Synanthedon* (*Aegeria*) *vespiformis*, Linn. (Laspy.), bred from larvae taken at the Tilgate Forest Meeting; *S. (Aegeria) flaviventris*, Stdgr. and *Alispa angustella*, Hb. bred from larvae taken last summer in the Isle of Wight; also a female specimen of *Pachythelia villosella*, Och. with empty pupa and larval case, which was found in Dorset in the spring by Dr. Bull. A larva of *Acosmetia caliginosa*, Hb. was also shown, taken in the Isle of Wight during the previous week.

Dr. Bull exhibited *Cosmotriche potatoaria*, L., ♀ ♀ bred from Kentish localities during the last few years, showing a considerable amount of variation.

He then read notes on his recent visit to Scotland.—“I spent the last ten days of July and the first few days of August collecting in Scotland with Messrs. Hughes, Crewdson, Mellows and Pooles, members of this Society. The weather was wet and cloudy with little sunshine and some very cold days. With a few exceptions Lepidoptera were not abundant, and the record number of insects on a sugar patch was 7. At Rannoch in Black Wood, *Calostigia* (*Malenydris*) *didymata*, L. was abundant with a fair number of *Lygris* (*Eustroma*) *populata*, L. and *Entephria caesiata*, Schiff. but few were disturbed by tapping tree trunks and overhanging foliage. *Erebia aethiops*, Esp. (*blandina*, F.) was late in emerging and less than a dozen females had been taken when I left Rannoch on 31st July. At sugar the commonest insect was *Noctua baia*, Fb. as also at Aviemore, closely followed by *Xylophasia monoglypha*, Hufn., and *Triphaena pronuba*, L. Of the rarer insects 3 or 4 of *N. sobrina*, Gn., *Mamestra*

furva, Hb., and *Phytometra* (*Plusia*) *festucae*, L. were taken. Of larvae fair numbers of *Palimpsestis* or, Fb., *P. ocularis*, L. (*octogesima*, Hb.), and *Acronicta menyanthidis*, View. were secured. At Aviemore conditions were similar, a few more *N. sobrina*, and *M. furva*, also *Triphaena comes*, Hb. and *N. castanea*, Esp. were taken as well as some very dark *Agrotis nigricans*, L. and very small *N. festiva*, Hb. var. *conflua*, Tr. Larva beating was productive, large numbers of *P. flavicornis*, L., *Notodonta dromedarius*, L., *Demas coryli*, L. and *Endromis versicolor*, L., some 50 of the last species being taken in a small area by 4 of us near Loch Morlich. One small birch produced about 24 full fed larvae of *Lycia* (*Biston*) *hirtaria*, Clrck., and many Geometrid larvae including *Selenia tetralunaria*, Hufn. were found. At dusk *Stilbia anomala*, Haw. was flying and a few *Carsia paludata*, Thnb. were taken in the sunshine. Larvae of *P. flavicornis*, and of some Geometers were badly infected with parasites.

Mr. Tompkins exhibited specimens of *Callimorpha quadripunctaria*, Poda, bred from larvae taken at Dawlish.

Various members gave their experiences of the present season.

30th AUGUST, 1936.

FIELD MEETING—BLACKHEATH AND FARLEY HEATH.

Leader.—F. J. COULSON.

A total of eleven members attended the meeting. The sunshine lasted throughout and an enjoyable time was spent on the heathlands and in the firwoods in the forenoon, and, in the afternoon, amongst the more varied growth in the southern portion of Blackheath and on Farley Heath.

As regards Lepidoptera few imagines were seen. *Phytometra* (*Plusia*) *gamma*, L. was frequent and *Lygris* (*Cidaria*) *testata*, L., *Plebejus* (*Lycaena*) *argus*, L. (*aegon*, Schiff.), *Coenonympha pamphilus*, L., *Eumenis* (*Satyrus*) *semele*, L. and *Chrysophanus phlaeas*, L. were occasionally seen on the wing. *Pachynemia hippocastanaria*, Hb. occurred amongst the heather and *Evetria* (*Enarmonia*) *pinicolana*, Dbldy. amongst the coniferous trees. One *Colias croceus*, Frcry., (*edusa*, Fab.), was observed. *Crambus hamellus*, Thnbg. were flying over the heather in the late afternoon and good series were secured. One specimen of *Selebria fusca*, Haw. was also secured and a pupa beaten from Scotch fir produced *Thera obeliscata*, Hb.

The lepidopterous larvae taken were not advanced. The following were secured: *Biston (Pachys) betularia*, L., *Thera obeliscata*, Hb. and *Ellopiia fasciaria*, L. (*prosapiaria*, L.), from the fir trees, *Agrotis porphyrea*, Hb. (*strigula*, Thnbg.), *Scoliopteryx libatrix*, L. and *Anarta myrtilli*, L. from the heather, and *Phaeosia dictaeoides*, Esp. and *Acronicta leporina*, L. from birches. Larvae of *Myelois neophanes*, Drnt. were also obtained.

Coleoptera were not numerous. In the puff-balls, which abounded in the firwood, *Cryptophagus lycoperti*, Scop. were numerous as were also *Bolitobius trinotatus*, Er., in decayed fungi. *Laemophloeus ater*, Ol. occurred with *Litargus connexus*, Geoff. and *D. lunatus*, F. in a species of *Daldinia* fungus on the gorse stems. Beating firs produced *Salpingus castaneus*, Panz., *Exochomus quadripustulatus*, L., *Anaitis ocellata*, L., *Myrrha 18-guttata*, L., *Mysia oblongoguttata*, L. and *Dromius quadrinotatus*, Panz. not infrequently. On the heath occurred *Chilocorus bipustulatus*, L. *Balaninus rubidus*, Gyll. was occasionally beaten from birch and on this tree *Strophosomus lateralis*, Payk. occurred as commonly as on heather. *Cicindela sylvatica*, L., were rather scarce flying by the firwood. By sweeping the heather *Cassida nobilis*, L. and *Coccinella 11-punctata*, L. were secured, and at the roots of the heather *Metabletus foveatus*, Geoff. were fairly common.

With regard to Heteroptera sweeping produced *Acompocoris pygmaeus*, Fall., *Tetraphleps vittata*, Fieb. and *Orthotylus ericetorum*, Fall., the last in abundance. *Piezodorus lituratus*, F., occurred on the furze, *Gastrodes ferrugineus*, L. on the firs and *Elasmotethus griseus*, L. on the oaks, commonly. *Stygnocoris pedestris*, Fall., were numerous at the roots of heather. *Pilophorus clavatus*, L., *Phytocoris varipes*, Boh. and *Calocoris infusus*, H.-S., were secured by general sweeping.

The only Homopteron that occurred in numbers was *Ulopa reticulata*, F., on the heaths. The harmony of the markings of this insect with the sweepings from the heather is very striking.

Fair numbers of the Orthopteron, *Platycleis brachyptera*, L., were observed.

Amongst Hymenoptera, *Cerceris arenaria*, L., were frequent, but none were observed with prey. *Vespa germanica*, F. was secured but this insect did not occur very commonly. *Apis mellifera*, L. and *A. ligustica*, Spin. were in abundance, the latter especially.

Sedum telephium, L., was seen by the roadside and three weeks later one of the members present at the meeting observed that it was tenanted by larvae of *Hyponometa vigintipunctata*, Retz.

10th SEPTEMBER, 1936.

The PRESIDENT in the Chair.

Mr. Niblett exhibited stems of *Hieracium umbellatum*, L. (Hawkweed), galled by larvae of the Gall-Wasp *Aulacidea hieracii*, Bouché, obtained by Mr. S. Wakely from Chilworth, 30.viii.36.

Dr. de Worms gave a short account of his recent trip to Aviemore in search of autumn larvae. He reported having found considerable abundance of many species including those of *Notodonta dromedarius*, L., *Palimpsestis duplaris*, L., *Polia* (*Mamestra*) *contigua*, Vill., *Gonodontis bidentata*, Clrck., etc. In the Chilterns *Lophopteryx cuculla*, Esp. was obtainable. But generally he had found the late summer season wherever he had been to be very poor indeed; *Lysandra* (*Polyommatus*) *bellargus*; Rott. made a very poor appearance, and *Colias croceus*, Fourc. was scarce.

Dr. Bull exhibited larvae of *Aplecta* (*Eurois*) *occulta*, L. from ova laid at the end of July.

Mr. S. Wakely exhibited the following:—(1) A bred series of *Myelois neophanes*, Durr., from Broadwater Forest, Sussex, together with larvae, feeding on the fungus *Daldinia* growing on burnt gorse from Chilworth, Surrey. Specimens of the fungus found on birch were shown for comparison with those growing on burnt gorse. (2) Larvae and imagines of *Aristotelia stipella*, Hb. from Norwood. (3) Larvae of *Ptychopoda subsericeata*, Haw. (New Forest) and *P. fuscovenosa*, Gtze. (Norwood). (4) Larvae of *Lycaenopsis argiolus*, L. (pink spotted form) from Cowes, Isle of Wight. (5) Larvae of two beetles—*Anthrenocerus australis*, Hope, and *Attagenus piceus*, Ol. (v. *megatoma*, Fb.)—and series of the imagines from Finsbury, the former species having been added recently to the List of British Coleoptera.

Mr. T. R. Eagles read the following note on Sparrows attacking *Plusia gamma*, L.—“Towards the end of August, 1936, the moth, *Plusia gamma*, L., was noticed to be abundant at a long row of pale blue catmint growing in one of the public gardens at Littlehampton, Sussex. The moths were flying from blossom to blossom, but were keeping to the lower parts, and were thus not conspicuous. They seemed to be preyed on systematically by the sparrows, for, although we did no more than take a passing glance at the catmint on our treks to and from the beach, we nevertheless on four occasions saw a moth caught and eaten. When the sparrow had finished its meal and had flown away we went to the spot and identified the wings.

“The sparrow’s method of hunting was to fly slowly along the row of catmint and, on finding a moth, to hover for a time a few feet above the plants before flying down to secure its prey.

“At the same flowers I took, in full sunshine, a fine male of the Agrotid moth *A. vestigialis*, Hufn.-Rott.

Mr. R. J. Collins exhibited the following Lepidoptera from Shetland and the Orkney Isles, taken in June, and read the following note.

SHETLAND:—*Eupithecia satyrata*, Hb. r. *curzoni*, Gregs.—These were quite common on the heather-covered hills. Unfortunately their habit of creeping into the heart of the heather for shelter caused them to be rubbed. Hence the small number obtained. They appeared to fly at all times of the day.

Perizoma albulata, Schiff.—Several forms. Abundant. South (Moths, II. p. 208) states that it “is to be seen on the wing, often in large numbers, in the late afternoon about sundown.” “Large numbers” is certainly correct! But they swarmed during midday near Lerwick, keeping however to their small patch of herbage, which was generally an allotment that had been allowed to go wild.

Hepialus fusconebulosa, de G. (*velleda*, Hb.)—Quite common after sunset, in the village (or town) of Scalloway.

Tortrix politana, Hw., *Phalonia enicana*, Dbldy. and *Pyrausta cespitalis*, Schiff. were caught close to Scalloway, probably common.

During our stay we saw but could not catch, one *Vanessa* (*Pyrameis*) *atalanta*, L. and several brown butterflies which I think were *Coenonympha tullia*, Müll. (*tiphon*, Rott.); *Plusia gamma*, L. was met with on our way back to Lerwick but as our killing bottle was packed away, the two I obtained beat themselves into shreds in a few moments. It seemed to me, however, that they were decidedly paler than those taken here in the south. But this is a matter which must wait for our next visit. Actually I think we were a little too early.

ORKNEY:—We spent only two days here and one of those was dull. However, all three “whites” were common, *Pieris brassicae*, L., especially so; *C. tullia* was common on the hills at the back of Stromness as was also *E. satyrata* from a patch of heather. *Xanthorhoë montanata*, Schiff. and *Cidaria ocellata*, L. were caught amongst the rough herbage close to the town. *V. (P.) cardui*, L. was seen.

Mr. L. T. Ford exhibited the life-history of *Mellisoblyptus bipunctatus*, Zeller, including male and female imagines, pupa cases and cocoon, a preserved larva, two of the curious “sand tubes” containing cocoons, the larval sand-tubes and an example of the

surface tunnel, and gave a short account of the same. [See "Ent. Record and Jr. of Var." XLVIII. 93, Sept. 1936].

A considerable amount of information on recent experiences in the field was given by numerous members.

12th SEPTEMBER, 1936.

FIELD MEETING—BYFLEET.

Leader.—F. J. COULSON.

Considering the weather conditions, the meeting was well attended, eleven members being present. During the forenoon three members worked the mixed wooded area towards Weybridge, but, owing to the fine showers the result was poor. In the afternoon the area by the canal towards Woking was covered. Heavy showers occurred in the earlier portion of the afternoon but, in spite of the conditions, many interesting observations were made. The weather, however, improved in the late afternoon and a good bag especially of lepidopterous larvae resulted from beating birch, oak, sallow and alder.

As regards Lepidoptera, *Aglais* (*Vanessa*) *urticae*, L., *Gonepteryx rhamni*, L., *Orgyia antiqua*, L., and *Lygris testata*, L. were observed on the wing. *Thera obeliscata*, Hb. was beaten commonly and *Trigonophora* (*Phlogophora*) *meticulosa*, L. and *Cosmia* (*Xanthia*) *fulvago*, L. were taken at rest on foliage. Pupae of *Aglais* (*Vanessa*) *urticae*, L. were found spun up.

Beating birch was very productive, larvae of *Hipparchus* (*Geometra*) *papilionaria*, L., *Palimpsestes duplaris*, L., *Drepana lacertinaria*, L., and *D. falcataria*, L., *Lophopteryx camelina*, L., *Acronicta leporina*, L., *Notodonta dromedarius*, L., *Dasychira pudibunda*, L., and *Hylophila prasinana*, L. being secured. The last species occurred also commonly on oak and spun up soon after. From sallows *Notodonta ziczac*, L. and *Calocalpe* (*Eucosmia*) *undulata*, L. were beaten, and *Cosymbia* (*Ephyra*) *punctaria*, L. and *Biston* (*Pachys*) *betularia*, L. from oak. *Hydriomena coerulata*, Fb. (*impluviata*, Hb.) were numerous on alder along the canal bank and *Amorpha* (*Smerinthus*) *populi*, L. was taken on aspen. *Thera obeliscata*, Hb. and *Macrothylacia rubi*, L. were also secured.

Coleopterous species were not numerous, *Dromius quadrimaculatus*, L., occurred on the oaks and *Lochmaea suturalis*, Th. with *Exochomus*

quadripustulatus, L., amongst heather. *Litargus connexus*, Geoff., *Diphyllus lunatus*, F. and *Ontholestes tessellatus*, Frc. were also taken.

With regard to Heteroptera, *Pantilus tunicatus*, F. and *Nabis apterus*, F. were both frequently beaten. *Ischnorhynchus resedae*, Panz. occurred rather commonly on the oaks and *Dictyonota strichnocera*, Fieb. was taken from gorse. *Triphleps majuscula*, Reut. was swept not infrequently. *Idiocerus populi*, L. on aspen, and the green form of *Psylla alni*, L. on the alders were the only Homoptera noticed.

By the canal banks "Touch-me-not," *Impatiens fulva*, Nutt. and the Skullcap, *Scutellaria galericulata*, L. were in flower.

24th SEPTEMBER, 1936.

The PRESIDENT in the Chair.

Mr. B. A. Cooper, 61, Okehampton Rd., N.W.18; Mr. M. Brown, West Kent Hotel, Bickley; and Mr. H. James, 41, Carron Rd., Dulwich, S.E.21, were elected members.

Mr. O'Farrell exhibited a number of British species of the Odonata (dragonflies) with the nymph skins, in illustration of his paper.

Mr. Jacobs exhibited living larvae of *Coleophora erigerella*, Ford. in seed heads of *Erigeron acre*, L. from North Kent. This species was first described by Mr. Ford in the "Entomologist" for 1935. Also a watercolour drawing of the larval cases *in situ* on the seed-heads; and larva of *Loxostege palealis*, Schiff. from North Kent.

Mr. Stephens exhibited local species of Coleoptera from the Chatham district including *Poophagus sisymbrii*, Fb., *P. nasturtii*, Germ. and *Staphylinus stercorarius*, Ol.

Dr. Cockayne exhibited a bred series of *Xanthia fulvago*, Lin. from Scotland including ab. *flavescens*, Esp. and ab. *obsoleta*, Tutt.

Mr. Syms exhibited living British grasshoppers.

Dr. de Worms exhibited larvae of *Eupithecia extensaria*, Frr. from Norfolk and larvae of *Cucullia absinthii*, Lin. from Dorset.

Dr. Blair exhibited a tropical American "tortoise" beetle *Pseudomesomphalia*, sp. (?) found in a grape fruit at South Norwood.

Mr. Hawkins exhibited larvae of *Eupithecia centaureata*, Schiff. (*oblongata*, Thnbg.) some being without markings, but with a stripe along the back. He reported that he had again found larvae of *Mimas tiliae*, Linn. on birch, this time on Wimbledon Common.

A small lime had been growing nearby during the previous year but had been blown down, the stump only remaining.

Mr. O'Farrell read a short paper, "A Short Introduction to British Dragonflies." (See Trans.)

Mr. S. Wakely read a short paper, "The Isle of Wight as a Collecting Ground for the Entomologist." (See Trans.)

8th OCTOBER, 1936.

The PRESIDENT in the Chair.

Mr. S. Wakely exhibited some larvae of *Coleophora virgaureae*, Stain. from Chilworth, Surrey. Also bred series of *Anaitis plagiata*, L. (Boxhill), and *Anaitis efformata*, Gn. (Selsdon) for comparison.

Mr. F. J. Coulson exhibited three specimens of *Anthrenocerus australis*, Hope, bred from larvae obtained by Mr. Wakely at Finsbury.

This species is identical with the insect exhibited as *A. trifasciatus* on 8th August, 1935. The larvae were found subsequently and the resultant beetles were determined by Dr. Blair as *Anthrenocerus australis*, Hope, an Australian species. (vide "E.M.M." Vol. LXXII. p. 174.)

Mr. Dennis exhibited a set of lantern slides of British parasitic plants mainly of the genus *Orobanche*, and subsequently one of the many series of slides bequeathed to the Society by the late Mr. R. Adkin.

Mr. F. J. Coulson also presented the Report of the Field Meeting held at Byfleet on 12th September, 1936.

22nd OCTOBER, 1936.

ANNUAL EXHIBITION AND CONVERSAZIONE.

This was the usual successful gathering of old friends, members and visitors, especially attracting those who live too far away to be regular at the fortnightly meetings. Exhibits were, perhaps, not quite so numerous as in recent years, but were exceedingly interesting, nevertheless, fine aberrations and rare and local species taken or bred during the past year being by no means few.

Mr. S. R. Ashby exhibited the British Coleoptera comprising species of *Donacia* and *Lema*, with the weevils of the genera *Otiorrhynchus*, *Polydrosus* and *Phyllobius*.

Mr. R. W. Attwood exhibited the more notable Lepidoptera taken by him in 1936 including *Euphydryas* (*Melitaea*) *aurinia*, Rott., *Melitaea athalia*, Rott., *Vanessa cardui*, L., *Ruralis* (*Thecla*) *betulae*, L., *Leptidea sinapis*, L., *Adopoea lineola*, Ochs., *Pergesa* (*Theretra*) *porcellus*, L., *Hylophila bicolorana*, Fues., *Ipimorpha* (*Plastenis*) *retusa*, L., *Erastria venustula*, Hb., *Angerona prunaria*, L., *Abraxas sylvata*, Scop., etc.

Mr. J. L. Atkinson exhibited *Leptidea* (*Leucophasia*) *sinapis*, L., 1st and 2nd brood from Dunsfold, Surrey, 1936, and *Monima* (*Taeniocampa*) *miniosa*, Fb. bred from larvae taken at Brentwood Field Meeting, June, 1935.

Mr. P. B. M. Allan, M.A., F.S.A., exhibited a series of the local Agrotid, *Agrotis raveda*, Schiff. (*obscura*, Brahm.) from Bishop's Stortford. in which neighbourhood he said it has been taken in some numbers of late years.

Mr. L. C. Bushby exhibited the following living insects, etc. Larvae of the "Citrus Papilio" (*Papilio demoleus*, L.), Crested Mantids (immature) (*Empusa egina*, L.), Hornets (queens) (*Vespa crabro*, L.), Cerambycid Beetle (*Saperda carcharias*, L.), Hunting Beetles (*Anthia venator*, Duf.), Scorpions (*Scorpio maurus*, Duf.).

Dr. G. V. Bull, exhibited series of *Abraxas grossulariata*, L., from Herts and N. London, and of *Boarmia roboraria*, Schiff., Herts, Kent and N. E. Sussex.

Mr. A. A. W. Buckstone exhibited series of—

1. *Colias croceus*, Frery.—Living larvae, pupae and imagines, Dorking, Surrey.

2. *Pieris napi*, L.—Variable series of spring, summer and autumn broods. Bred, Surrey.

3. *Polygonia c-album*, L.—Variable series of summer and autumn broods bred and captured, Surrey and Sussex.

Mr. H. G. C. Jones exhibited the Lepidoptera taken by him in the Canary Islands in June, 1936.

Mr. G. A. Cole exhibited a male specimen of *Satyrus* (*Melanargia*) *galathea*, L., with blurred grey markings, from Dorset; a male specimen of *Sideridis* (*Leucania*) *l-album*, L., taken at ivy bloom in Devonshire; bred series of *Phragmatobia fuliginosa*, L., from London and *Xantholeuca* (*Oporina*) *croceago*, Fb., from Herefordshire; caught specimens of *Orrhodia* (*Dasycampa*) *rubiginea*, Fb., *Noctua* (*Agrotis*) *castanea*, Esp. and the var. *neglecta*, Hb., *Chloridea* (*Heliothis*) *dipsacea*, L., *Drymonia trimacula*, Esp.; and some examples of dark forms of *Hemerophila abruptaria*, Thnbg., from North London.

Dr. E. A. Cockayne exhibited water colours, by Miss Gallwey, of Porritt's types of *Abraxas grossulariata*, L. ab. *mixta*, ab. *odersfeltia*, ab. *albovarleyata*, ab. *aureofasciata*, ab. *melanapicata*, all of which were described and named by the late Mr. Porritt. Also bred British examples of *Catocala fraxini*, L., *Sideridis* (*Leucania*) *vitellina*, Hb. and *Sideridis* (*Leucania*) *albipuncta*, Fb.

Mr. J. C. Danby exhibited 4 *Maniola tithonus*, L., 2 ♂ 2 ♀, one male pale markings (near St Ives, Hunts), 1 ♀ in which black markings are replaced by very pale fawn except apical spot which is darker, and 1 typical (Totland Bay).

9 *Maniola jurtina*, L., 3 ♂ 6 ♀, taken wild in 1936 in various localities, one ♂ with bright fulvous markings, four ♀ with pale markings.

19 *Coenonympha pamphilus*, L., taken wild, 1936, various localities, 10 ♂ 9 ♀ showing varying coloration and markings.

11 *Coenonympha pamphilus*, L., including 3 having black dots inside margin on hindwings. 1 with black dot on left hindwing only. 1 with small ringed spot below apical spot on underside of upper wings and a small black dot inside margin of upper side of lower wings. 4 with pale markings. 1 with dark hindwings, and 1 with dark borders and dark colouring.

Also *Triphaena fimbria*, L., bred from pupa (Sutton) with right hindwing having a circular hole about $\frac{3}{16}$ " in diameter in black band just inside orange border which is intact.

Mr. S. P. Doudney exhibited a large number of Lepidoptera from various Scotch and English localities including:—

Aviemore.—*Noctua sobrina*, Gn., *Syngrapha* (*Plusia*) *interrogationis*, L., *Carsia paludata*, Thnbg. r. *imbutata*, Hb., *Perizoma blandiata*, Schiff.

Perthshire.—*Acronicta menyanthidis*, View., *Itame fulvaria*, Vill. (*brunneata*, Thnbg.).

Dorking.—*Zygaena trifolii*, Esp. (confluent).

N. Forest.—*Hemaris tityus*, L. (*bombyliiformis*, Hw.).

Kent Marshes.—*Harmodia* (*Dianthoecia*) *lepida*, Esp. (*carpophaga*, Bork.), *Euxoa* (*Agrotis*) *cinerea*, Hb., *Sideridis* (*Leucania*) *albipuncta*, Fb.

Wye Valley.—*Leptidia sinapis*, L. ab. *ganarew*, Frowh. (with yellow apical blotch to fore-wing.), *Minoa murinata*, Scop. (*euphorbiata*, Schiff.).

E. Sussex.—*Drymonia chaonia*, Hb., *Notodonta trepida*, Esp., *Polyplocia ridens*, Fab., *Cucullia asteris*, Schiff.

Wicken Fen.—*Phragmatoecia castaneae*, Hb. (*arundinis*, Fab.), *Banksia* (*Erastria*) *argentula*, Hb., *Aplecta advena*, Fb., *Sideridis obsoleta*, Hb.

Mr. R. C. R. Crewdson exhibited series of *Cosmia paleacea*, Esp., *Noctua depuncta*, L., *Plusia bractea*, Fb., from Forres, Morayshire. *Boarmia repandata*, L., including ab. *conversaria*, Hb., from Kinlochewe, Rossshire. *Gnophos* (*Dasydia*) *myrtillata*, Thnbg., *Itame* (*Thamnonoma*) *fulvaria*, Vill. (*brunneata*, Thnbg.), from Rannoch, Perth. *Zygaena exulans*, Hoch., from Braemar, Aberdeen.

Mr. T. R. Eagles exhibited a selection of Macro-Lepidoptera reared or taken by him in 1936,—and on behalf of Mr. E. A. Bowles var. *alba* (?) = ab. *ganarew*, Frwk. (?) of *Polygonia c-album*, L., taken in the garden of Myddelton House, Enfield, in August last.

Mr. W. S. Gilles exhibited various species bred during the season 1936 and a selection of the Lepidoptera obtained during some years past in the Island of Skye and of which an account appeared in the "Entomologist's Record" in Sept., 1936, p. 94.

Mr. C. N. Hawkins exhibited the following bred British Heterocera :—*Catocala fraxini*, L., *Sideridis* (*Leucania*) *vitellina*, Hb., *Chloridea peltigera*, Schiff., *Palimpsestis fluctuosa*, Hb., *Euphyia cuculata*, Hufn., *Abraxas grossulariata*, L., *Boarmia roboraria*, Schiff.

Mr. J. O. T Howard exhibited short series of the following Lepidoptera taken or bred in 1936:—*Pachetra fulminea*, Fb. (*leucophaea*, View.), *Palimpsestis fluctuosa*, Hb., *Nonagria geminipuncta*, Hatch., *Sideridis* (*Leucania*) *albipuncta*, L., *Orrhodia rubiginea*, Fb., *Orthonama obstipata*, Fb. (*Percnoptilota fluviata*, Hb.), and aberrations of *Lasiocampa trifolii*, Esp. (5 ♂ without bands), *Harmodia* (*Dianthoecia*) *lepida*, Th. (*carpophaga*, Bork.), *Eupithecia abbreviata*, Steph. (melanic), *Biston betularia*, L. (2 intermediate ♂), *Biston strataria*, Hufn. (suffused ♂).

Messrs. Russell James, Sen. and Jun., exhibited series of *Cosmotriche potatoria*, L., and of *Lasiocampa* (*Pachygastris*) *trifolii*, Esp. Also specimens captured and bred 1935-6 of *Plusia chryson*, Esp., *Parascotia* (*Boletobia*) *fuliginaria*, L., *Thera variata*, Schiff., *Odontotia carmelita*, Esp., *Orrhodia rubiginea*, Fb., *Xantholeuca* (*Oporina*) *croceago*, Fb., *Eupithecia extensaria*, Fr., *Euphyia* (*Anticlea*) *cuculata*, Hufn., (*sinuata*, Hb.). One spot vars. of *Mimas tiliae*, L. Two series of *Chloridea* (*Heliothis*) *peltigera*, Schiff., showing effect of temperature on pupae.

A long series of Scottish *Zygaena achilleae*, Esp., and local race of *Z. filipendulae*, L. from the same locality.

Dr. Harold King, F.R.S., exhibited a bred series of *Xylomyges conspicillaris*, L. from Taunton and a series of *Lampropteryx* (*Cidaria*) *otregiata*, Metelf. from S Devon.

Mr. H. A. Leeds exhibited 103 specimens of 13 species of British Rhopalocera, captured during 1936 including *Colias croceus*, Frery., ab. *helice*, Hb., *Maniola tithonus*, L., ♀ upperside with very large apical spots, and 96 named aberrationally from his manuscript awaiting publication,* amongst them being:—*Maniola jurtina*, L., ♂ upperside, *partimtransformis*. *Euchloë cardamines*, L., ♂ uppersides, *antiparvilunulata*, and *lutescens* (paler orange). *Aricia agestis*, Schiff., ♂ upperside, *pallidula-transformis*. *Lysandra coridon*, Poda, ♂ uppersides, *viridescens*, *ultracaeruleo*, *lavendula*; ♀ uppersides, *radio*, *infrasemisyngrapha*, *semisyngrapha*, *syngrapha*, *postimpar*, *postcaeruleo-maculae*, *roystonensis*, *brunnescens-transformis*; ♀ undersides, *fulvescens*, *grisea*, *transformis*, *postcaeca*. *Polyommatus icarus*, Rott., ♂ undersides, *ultradiscreta*, *I-nigrum-semiarcuata*; ♀ uppersides, *opposita*, *radiosa*, *postdecrescens*: ♀ undersides, *postcaeca*, *antiradiata*; (*anti* is abbreviated from *antico* and *post* from *postico*).

Colonel S. H. Kershaw exhibited many minor aberrations of *Aglais urticae*, L., bred or caught in Bedfordshire in 1936.

Mr. R. J. Leader exhibited aberrations of British Butterflies.

Mr. H. Moore exhibited species of Ant-lion, *Myrmelionidae*.

The Rev. J. N. Marcon exhibited the following Lepidoptera:—

1. All taken or bred during 1936.

Pieris napi, L. Albino ♀, markings showing faintly. Bred March. Donegal strain.

Euchloë cardamines, L. ♂ colour form. ♂ var. *quadripuncta*, Wms. ♀ black markings replaced by grey.

Argynnis euphrosyne, L. 2 banded forms ♀ and 1 golden ♂.

Argynnis selene, Schiff. Heavily blacked primaries leaving row of small spots on margin and small central area fulvous. ♀.

Aphantopus hyperantus, L. 3 ab. *lanceolata*, Shipp. New Forest. ♂ s.

Melitaea athalia, Rott. 5 unusual forms.

Limenitis camilla, L. (*sibilla*, L.). 1 ab. *semi-nigrina*, Tutt. New Forest.

Aglais (*Vanessa*) *urticae*, L. var. *polaris*, Stg.

Plebejus (*Lycaena*) *argus*, L. (*aegon*, Schiff.). 1 striated ♀, 1 ♂ with extra wide border.

* These are not names but descriptive terms.—EDITL. COM.

2. Mostly caught by other collectors at different times.

Maniola (Epinephele) tithonus, L. 6 specimens showing a wide range of colour development. One is especially noteworthy as having a pearly-grey border in place of the usual black. Though the fulvous remains as usual, the insect presents a striking picture. This is undoubtedly a development towards the famous "Ludgers-hall" specimen.

Colias croceus, Fourc. (*edusa*, Fab.). 3 ♀ with markings obsolete, and 1 remarkable gynandrous specimen having undoubtedly a male body and with the male sexual mark, yet having some of the orange spots of the female in the border and on a background which careful examination shows to be deeper than the surrounding "male" black.

Polyommatus (Lycaena) icarus, Rott. 6 illustrating different degrees of striation.

Aricia (Lycaena) agestis, Schiff. (*astrarche*, Bergst.). 2 slightly striated, 1 obsolete spotting and 1 remarkable specimen devoid entirely of spots in the margin or otherwise, save for faint discals on the forewings alone, the ground-colour being a beautiful creamy-white.

Lysandra (Lycaena) bellargus, Rott. 7 males showing variation of colour.

Argynnis selene, Schiff. 1 silver-white male, 1 underside male with a band of black spots in both primaries and secondaries, 1 female with heavy black border entirely obscuring marginal fulvous colour, and 1 female banded on the forewings and largely melanic on the hindwings.

On behalf of Mr. S. A. Chartres, the Rev. J. N. Marcon exhibited:—

Argynnis adippe, L.—A remarkable specimen of fawn colour with markings on all four wings largely obsolete. 1910.

Ditto. 1936. Underside.—The fulvous colour replaced by brick-red. A handsome insect.

Argynnis paphia, L. A fine melanic male very darkly marked, captured New Forest, 1918.

Argynnis euphrosyne, L. Two fine banded forms, 1934 and 1936 respectively. 1 ♂ very pale straw colour. 1 ♂, 1936, very pale fulvous, markings on forewings largely absent, hindwing ditto apart from marginal spots joined in pairs.

Mr. M. Niblett exhibited some South African Galls caused by *Trypetidae*, *Cecidomyiidae* and *Lepidoptera*; and also various British Galls and Gall-causing Insects, *Cynipidae* and *Cecidomyiidae*.

Mr. A. M. Morley exhibited the following British Lepidoptera taken or bred during 1936.

1. *Papilio machaon*, L. ♀ of Continental form, one of two taken by small boys at Dymchurch, 24.vii.36. A third was taken near Folkestone 29.viii.36.

2. *Maniola tithonus*, L. ♂ Dorset. Left apical spot very small.

3. *Plebejus argus*, L. (*aegon*, Schiff.). ♀ Dover. Basal part of all forewings blue.

4. *Lysandra (Polyommatus) coridon*, Poda. ♀ ♀ Sussex. Two unevenly marked with blue, one that looks like a *coridon-icarus* hybrid, one var. *fowleri*, South, one with grey hindwings and one var. *fuscofimbriata*, Tutt.

5. *Hyloicus (Sphinx) pinastri*, L. 3 bred from Dorset larvae, ♂ typical, two ♀ ♀ mouse-coloured.

6. *Agrotis (Eueretagrotis) agathina*, Dup. 12 bred from 16 larvae found in Weald of Kent.

7. *Abraxas grossulariata*, L. ♀ heavily marked, ♂ var. *dohrni*, Koenig. (*lacticolor*, Raynor.) bred from Folkestone larvae.

8. *Hama furva*, Hb. Three taken at Folkestone.

9. *Angerona prunaria*, L. 9 different forms bred from larvae found on heather. Weald of Kent.

Mr. S. G. Wallis Norton exhibited a somewhat unusual top-and underside aberration of *Argynnis selene*, Schiff., taken at Broadwater Forest this year.

Three underside vars. of *Polyommatus (Lycaena) icarus*, taken at Newquay this year. (*melanotoxa*, Pin-M., *costa-juncta*, Tutt, and *icarinus*, Scharf.)

A modification of var. *polaris*, Stdgr. of *Aglais (Vanessa) urticae*, L., taken at Purley, Surrey, this year.

A melanic var. of *Plebejus (Lycaena) aegon*, Schiff. (*argus*, L.) male taken at Beaulieu Heath last summer.

Mr. G. B. Oliver exhibited *Argynnis paphia*, L. ♀ underside. coloration of secondaries being of a deep olive brown; *Melitaea athalia*, Rott., a living imago which had emerged on 19th Oct. from ovum of July, 1935. An instance of natural delayed development.

Melitaea cinxia, L. Wild and bred aberrations from Isle of Wight.

Melitaea athalia, Rott. Wild and bred aberrations from Kent:—Undersides in each section showing an extension of the centre creamy-white bar of the secondaries; and another pair, both under normal size, with underside of primaries strongly rayed (as in *ab. eos*, Haw.), the secondaries heavily marked with black, red-brown

and chocolate, and a lessening of the dark cream band. A specimen approaching *ab. eos*, and a damaged bred female of the straw-coloured form.

A bred series of *Satyrus galathea*, L. *ab.* The pearly white form, upper and undersides of both sexes.

On behalf of Col. L. Wood, Mr. G. B. Oliver exhibited wild captures of 1936. *M. jurtina*, L., ♀ Albino, Wilts. *M. athalia*, Rott., ♂ an extreme aberration. Upper side almost all black excepting small submarginal spot of the normal ground shade: underside, primaries with broad black lines between the nervures, secondaries, dark brownish blotch at the base, strikingly pale transverse band, outer portion heavily marked with deep brown, Kent. *Aglaia urticae*, L., a specimen without the usual first costal spot on primaries. Wilts. *Lysandra (Polyommatus) bellargus*, Rott., gynandromorph. Right side ♂, left side brown form of ♀. Wilts. *Chrysophanus (Heodes) phlaeas*, L., *abs. alba*, Tutt, *radiata*, Tutt, and *obsoleta*, Tutt. Wilts.

Mr. S. W. P. Pooles exhibited a series of *Poecilopsis (Nyssia) lapponaria*, Bdv. and varieties of British Macro Lepidoptera taken by him during 1936.

Mr. C. O. Ridley exhibited a specimen of *Pyrausta (Botys) nubilalis*, Hb. taken on 21.vi.36 on Glynde Down, Lewes.

Mr. A. G. B. Russell exhibited a selection of insects taken in the past year in Dorset, including an example of *Plusia ni*, Hübn., which he netted on the night of 23rd August at flowers of Veronica in his grounds at Swanage (W.P.C.* cites only two previous captures of this rare immigrant in Dorset, in 1885 and 1888); a specimen of *Senta maritima*, Tausch, from Studland (only two previous records cited by W. P. C.* for Dorset, in 1909 and 1933, single specimens and in the same locality); two examples of *Nonagria sparganii*, Esp. also from Studland; one of *Meliana flammea*, Curt. from the Wareham district (a single previous record cited by W.P.C.* for Dorset, in 1929); one of *Caradrina bondii*, Knaggs, from Charmouth; four of *Sideridis (Aletia) albipuncta*, Fabr., including a dark greyish form; one of *S. (A.) vitellina*, Hübn., and a fine form of *S. (A.) conigera*, the forewings very bright red with the triangular white spot at the lower end of the reniform exceptionally large, and dark hindwings; the last three from Swanage. Other insects from Swanage include a specimen of *Ptychopoda degeneraria*, Hübn., taken in his light trap by his son J. A. P. Russell on 17th September (a new locality for an insect almost exclusively confined to the Isle of Portland and of

especial interest too as representing a second brood which is of rare occurrence in this country); one of *Rhyacia* (*Agrotis*) *lucernea*, Linn. (W.P.C.* cites only a single previous capture at Swanage, by Sir Christopher Lighton, circa 1845); two notable examples of a rare melanic form of *Luperina testacea*, Hübn.; a melanic form of *Eupithecia subfulvata*, Haw. and one of *Phigalia* (*Apocheima*) *pedaria*, Fabr. (stated by W.P.C. to be the first example of this form to be taken in Dorset); a remarkable form of *Crocallis* (*Gonodontis*) *elinguaria*, Linn. heavily marked and powdered with black, and two specimens of *Loxostege palealis*, Schiff. Among insects from other Dorset localities were melanic forms of *Agrotis ypsilon*, Rott. and *Plusia chrysitis*, Linn., a series of six *Euphyia* (*Hydriomena*) *rubidata*, Schiff., and of *Orthonama* (*Hydriomena*) *obstipata*, Fabr. (*fluviata*, Hüb.), of twelve *Phragmatocia castaneae*, Hübn., three *Trichiura* (*Eriogaster*) *crataegi*, Linn. and a specimen of *Eustrotia uncula*, Clerck.

Mr. S. G. Castle Russell exhibited the following aberrations either bred or taken by himself.

Limenitis camilla, Linn. 1 male ab. *nigrina*, Weym. 1 female ab. *semi-nigrina*, Frwh.

Aphantopus hyperantus, Linn. 1 ♂ var. *lanceolata*, Shipp. 1 ♀ ditto with extraordinary large spots.

Argynnis paphia, Linn. 1 ♂ ab. *confluens*, Spul. 1 ♀ var. *valesina*, Esp. ab. *nigrizina*, Frwh., entirely black and spotless.

3 ♀ abs. of *Maniola jurtina*, Linn, Devon and Winchester. 1 upperside ab. and 1 underside ab. of *Euphydryas aurinia*, Rott., Wilts. 1 ab. *Aglaïs* (*Vanessa*) *urticae*, Linn., Winchester.

Argynnis selene, Schiff. 1 upperside ab., Winchester.

Argynnis euphrosyne, Linn. 1 upperside ab. and 1 underside ab., Winchester.

Polyommatus (*Lycaena*) *icarus*, Rott. One gynandromorph, upper and underside. Left wings ♀: Right wings ♂, Winchester. One underside ab. *striata*, Tutt., extreme form ♀, Winchester. One underside ♀ ab. *striata*, Tutt, Winchester. One upperside ♀, Winchester.

On behalf of W. S. Pitt, Esq., Mr. S. G. Castle-Russell exhibited photographs of tropical fish.

Dr. E. Scott exhibited species of the genus *Melitaea* from Portugal.

Mr. Stanley Smith exhibited series of *Epia* (*Dianthoecia*) *irregu-*

* W. Parkinson Curtis. List of the Lepidoptera of Dorset. "Transactions of the Society for British Entomology," Vol. I. Part 2, 1934.

laris, Hufn., both bred and captured at dusk. Varied series of *Ochria aurago*, Fb., bred from Sussex, 1899. Varied series, generally dark, of *Mellinia gilvago*, Esp. bred from Huntingdon larvae, with ab. *intermedia*, Hüb. and ab. *gilvescens*, Wood., forms of *Mellinia ocellaris*, Bork., for comparison. Series of wild caught *Agrotis agathina*, Dup., Studland. An obsolete *Aricia* (*Lycaena*) *agestis*, Schiff. (*astrarche*, Brgstr.). Extreme forms of *Harmodia* (*Dianthoecia*) *lepida*, Esp. (*carpophaga*, Bork.), *Euxoa* (*Agrotis*) *exclamationis*, L., and *Noctua xanthographa*, Schiff.

Mr. S. Wakely exhibited many species of Lepidoptera taken during the current season, including the following: *Cryptoblabes gnidiella*, Millière, bred from a larva feeding on the rind of orange. An unknown species of *Teneina* bred from a banana-feeding larva; this moth was sent to Mr. E. Meyrick, who said it answered the description of no species known to science, and he subsequently named it **Opogona antistacta**. *Telphusa alburnella*, Dup., a species new to Britain discovered a few years ago by Mr. A. Smith at Strensall, Yorks. *Monodes venustula*, Hübn. (Warley, Essex); *Ptychopoda rusticata*, Fabr. (N.W. Kent); *Eupithecia tantillaria*, Bdv. (*pusillata*, Fabr.) (Tilgate Forest, Sussex); *Thera* (*Hydriomena*) *variata*, Schiff. (Chilworth, Surrey); *Perizoma alchemillata*, Linn. (bred, Appleford, Isle of Wight); *Brephos notha*, Hübn. (bred, Ongar, Essex); *Alispa angustella*, Hübn. (bred, Combley Down, I.W.); *Hypochalcia ahenella*, Hübn. (Norwood, Surrey); *Salebria betulae*, Göze (bred, Tilgate Forest); *S. fusca*, Haw. (Chilworth); *Myelois neophanes*, Durr. (bred, Broadwater Forest, Sussex); *Crambus hamellus*, Thunb. (Chilworth); *C. contaminellus*, Hübn. (Norwood); *Pyrausta asinalis*, Hübn. (Ventnor, I.W.); *Pterophorus tephradactyla*, Hübn. (bred, Dunsfold, Surrey); *Stenoptilia zophodactylus*, Dup. (bred, Whippingham, I.W.); *Phulonia gilvicomana*, Zell. (bred, Surrey); *Peronea comariana*, Zell. (bred, Appleford, I.W.); *P. shepherdana*, Steph. (bred, Cutt Mill, Surrey); *P. boscana*, Fabr. (bred, Osborne, I.W.); *Evetria purdeyi*, Durr. (Gurnard, I.W.); *Polychrosis fuligana*, Haw. (Ashtead, Surrey); *Hemimene flavidorsana*, Knaggs (Norwood); *Aristotelia stipella*, Haw. (bred, Norwood); *Gelechia diffinis*, Haw. (Chilworth); *Telephila schmidiella*, Heyd. (Boxhill, Surrey); *Depressaria angelicella*, Hübn. and *D. conterminella*, Zell. (bred, Dunsfold, Surrey); *Synanthedon* (*Aegeria*) *vespiformis*, Linn. (Tilgate Forest); *S. (A.) flaviventris*, Staud. (bred, Parkhurst Forest, I.W.); *Eupista conspicuella*, Zell. (Benfleet, Essex); *E. troglodytella*, Dup. (bred, Boxhill, Surrey); *Orthotaelia sparganella*,

Thunb. (bred, Appleford, I.W.) ; *Monopis crocicapitella*, Clem. (Newport I.W.).

Mr. S. N. A. Jacobs exhibited the type specimen of the Tineid moth since named by Meyrick, *Metarsiora horrealis*, Meyr. constituting a new genus as well as a new species.

Dr. Harold B. Williams exhibited :—*Satyrus galathea*, L., ♂ and ♀ with central black mark extended to margin, Dorset, August, 1936. *Polyommatus (Agriades) coridon*, Poda : ♂ ab. *fowleri*, South, Dorset ; ♂ ab. *pallida*, Tutt, I. of Wight ; 3 ♀ ab. *inaequalis*, Tutt, I. of Wight ; ♀ ab. *dextro-striata*, Tutt ; light and heavily spotted undersides, all in Aug. 1936 ; ♀ ab. *roystonensis*, Pick., Royston, Aug. 1936. *Polyommatus icarus*, Rott. ab. *costajuncta*, Tutt, Portsmouth, Aug. 1936. *Abraxas grossulariata*, L. ab., Hampton, Middlesex, 1936.

Mr. H. Wells exhibited captures in the field, 1936. Series of *Polyommatus (Lysandra) coridon*, Poda, including a female *obsoleta*, Tutt, a remarkable aberration, from Hertfordshire ; also series of *Brenthis euphrosyne*, L., from the Wye Valley ; and a pure ab. *obsoleta*, Tutt, of *Aphantopus hyperantus*, L., from Horsley.

Dr. C. G. M. de Worms exhibited—

(A) A selection of British Lepidoptera taken and bred during 1936 including series of :—

- (1) *Lophopteryx cuculla*, Esp. (bred ex Bucks).
- (2) *Callimorpha quadripunctaria*, Pod. (*hera*, L.), (South Devon).
- (3) *Lithosia pallifrons*, Zell. (*pygmaeola*, Dbldy.), (East Kent).
- (4) *Endrosa irrorella*, Hb. (Cotswolds).
- (5) *Acronicta psi*, L. (Rannoch).
- (6) *Eurois occulta*, L. (Rannoch).
- (7) *Mamestra contigua*, Vill. (Rannoch).
- (8) *Dianthoecia andalusica*, Stdgr. var. *barrettii*, Dbldy. (bred ex Cornwall).
- (9) *Hama (Aplecta) adusta*, Esp. melanic forms (Rannoch).
- (10) *Xylophasia monoglypha*, Hufn. melanic forms (Rannoch).
- (11) *Leucania putrescens*, Hb. (South Devon).
- (12) *Lithomia solidaginis*, Hb. (Aviemore).
- (13) *Acidalia ornata*, Scop. (Cotswolds).
- (14) *Entephria (Larentia) caesiata*, Schiff. (Rannoch).
- (15) *Philereme (Scotosia) transversata*, Hufn. (*rhamnata*, Schiff.), (bred ex Kent).
- (16) *Boarmia repandata*, L. (Rannoch).
- (17) *Itame (Thamnonoma) fulvaria*, Vill. (*brunneata*, Thnbg.), (Rannoch).

- (18) *Zygaena exulans*, Hoch. (Braemar).
 (19) *Ino cognata*, H.-S. (Cotswolds).
 (B) *Coenonympha tullia*, Mull. (*tiphon*, Rott.), comparative series taken from four localities:—Whitchurch, Witherslack, Carlisle and Rannoch.
 (C) *Erebia epiphron*, Knoch., series taken at Rannoch.
 (D) *Lysandra* (*Polyommatus*, *Lycaena*) *bellargus*, Rott. Blue forms of the female including f. *ceronus*, Esp. and two spotless undersides (Cotswolds).
Lysandra coridon, Poda, male f. *fowleri*, South, females *semi-syngrapha*, Tutt, undersides *costajuncta*, Tutt, *confluens*, Tutt, etc., obsolescent forms from Kent, Sussex, Herts and Dorset.
Polyommatus (*Lycaena*) *icarus*, Rott. Large and very blue forms of the female from Cotswolds and Rannoch.
Cupido minimus, Fues., obsolescent underside.

Mr. N. G. Wykes exhibited forms of British *Lycaenidae*. Varieties of *Polyommatus* (*Lysandra*) *coridon*, Poda. All taken in summer of 1936, including 2 ♂ *plumbescens*, Tutt (one v. dark, one slate), 1 ♀ *plumbescens*, Tutt, ♂ and ♀ *fowleri*, South, ♂ and ♀ *obsoleta*, Tutt, ♀ extreme *glomerata*, Tutt.

Mr. Clifford Wells exhibited varieties of British Butterflies, including several gynandrous *Plebeius aegon*, Schiff. = *argus*, L.

12th NOVEMBER, 1936.

The PRESIDENT in the Chair.

Mr. T. D. Buck, 49 Elthorne Rd., Holloway Rd., N.7, and Mr. V. E. August, 59, Hillcross Avenue, Morden, Surrey, were elected members.

Mr. T. R. Eagles exhibited specimens of the heather beetle, *Lochmaea suturalis*, Th., recently reported in the press as doing extensive damage to grouse moors; also the allied species *L. capreae*, L. and *L. crataegi*, Först.

Mr. Doudney exhibited an example of *Daphnis* (*Deilephila*) *nerii*, L. bred from a larva taken at Monte Carlo.

Mr. Jacobs exhibited a sample of the corrugated cardboard, which he used in warehouses to catch lepidopterous larvae.

Dr. E. A. Cockayne exhibited a short series of *Phytometra* (*Plusia*) *chrysitis*, L., and read the following note.—“At Forres I found ten eggs of *P. chrysitis*, L., laid on the underside of leaves of *Galeopsis*

tetrahit, L. On one leaf there were two eggs, but only one on each of the others. The first eight eggs hatched on 10th August, and the ecdyses of the two larvae which grew fastest were as follows—first 13th August, second 16th August, third 18th August and fourth 21st August. They spun cocoons on 25th and 26th August respectively, having taken only fifteen and sixteen days to reach full growth. The imagines emerged on 13th and 14th September respectively. The remainder grew more slowly and one remained at the hibernating stage.”

Mr. Crewdson exhibited the lepidoptera he showed at the Exhibition and gave notes on the various species.

Members made observations on the various exhibits at the Annual Exhibition and Mr. Stephens remarked on the loss of scent in a musk plant kept by a friend.

Mr. J. A. Stephens exhibited the following Coleoptera:—

1. *Teretrius picipes*, F. Very rare; taken on a dead ash tree at Waterslade, Chatham, on 8.vii.36. A few have been taken at Shirley, Forest Hill, Camberwell, Peckham. At Upper Norwood, this species was not so rare 50 years ago as now. It is usually taken under bark, sometimes on the wing or on walls.

2. *Monotoma brevicollis*, Aubé. rare; taken in haystack refuse. Chatham. 12.x.36.

3. *M. sub-4-foveolata*, Aubé, also in haystack refuse, which was taken from a warehouse from hay, which had just come from Redhill, Surrey; this is also rare.

4. *Pseudopsis sulcata*, L. Rare. From hay refuse; 6.xi.36.

5. *Triplax aenea*, Schall. Rare, taken at Cobham Wood in fungi on stump of hazel, 17.x.36.

6. *Thalycra sericea*, Sturm. Rare. Under bark, Cobham Wood 5.viii.36.

7. *Diphyllus lunatus*, F. as a rule rare.

8. *Triphyllus suturalis*, F. not common. Two or three of each were taken same day as *Teretrius picipes*, on same tree.

9. *Mycetophagus pncens*, F. taken in fungi on ash tree in Cobham Park. This was the only other beetle found in a very large piece of fungus the same day as No. 6.

26th NOVEMBER, 1936.

The PRESIDENT in the Chair.

Mr. Eagles exhibited the "elm beetles," *Eccoptogaster scolytus*, Fb. and *E. multistriatus*, Marsh., the former of which is said to aid the spread of the fungus disease of elms. Also *Aulonium trisulcum*, Geoff., a predator on the larvae of the weevils.

Dr. E. A. Cockayne exhibited three examples of *Polia chi*, L. from East Aberdeenshire: typical *P. chi*, ab. *olivacea*, St. and an intermediate form having something of the suffused appearance of ab. *olivacea*, but with a coloration nearer typical *chi*.

Dr. G. V. Bull exhibited *Eurois (Aplecta) occulta*, L. bred on 1st October from ova laid in July by a female captured at Rannoch. Also two examples of *Maniola jurtina*, L. showing injury by birds (beak marks).

Dr. K. G. Blair exhibited the aethalioid form of a Mycetozoon, *Reticularia lycoperdon*, Bull., received from Miss Lister. The specimen contained a compact group of cocoons of the Mycetophilid fly, *Epicrypta testata*, Edw. from which the parasites *Xenotoma fallax*, Kieff. (*Belytidae*) and *Aperileptus* sp. (*Ichneumonidae*) had since emerged.

A series of lantern slides from the collection of the late R. Adkin was exhibited, chiefly those depicting main groups of the microlepidoptera.

10th DECEMBER, 1936.

The PRESIDENT in the Chair.

The new members elected were:—W. H. A. Harris, 48, Corringway, W.5.; B. S. Goodban, 81, West Street, Ewell, Surrey; E. W. Classey, 141, Portnall Road, Maida Hill, W.9.; S. A. Chartres, 9, King's Drive, Eastbourne, Sussex; W. J. Finnigan, 6, Shrubland Grove, Worcester Park; R. E. Warrier, 147, Friern Road, S.E.22.

Dr. G. V. Bull reported having noted an example of *Phigalia pedaria*, Fb. on 3rd December.

Mr. Hy. J. Turner, on behalf of Mr. A. J. Wightman, exhibited a very varied series of *Rhyacia (Agrotis) ripae*, Hb. from Sussex, and said that Mr. Wightman considered the ground colour as always white although obscured at times very considerably by dark markings. The examples shown were graded from a pure white

with only traces of obscure markings to examples with well-distributed and varied markings.

Mr. Bliss exhibited an example of the S. American cockroach, *Panclora cubensis*, Sauss., found among bananas from Brazil.

Mr. R. A. R. Priske exhibited a series of varieties of the Mollusc *Helix aspersa*, Müll., from near Brighton.

Dr. Cockayne exhibited a photograph of the Saturniid moth *Actias selene*, Hb., from India, exhibiting aberrant neurulation.

Mr. S. N. A. Jacobs exhibited a number of leaves mined by the larvae of the *Nepticulidae* in illustration of the paper subsequently read by him.

Mr. T. R. Eagles exhibited the larvae of the narcissus-fly, *Merodon equestris*, L., and bulbs which had been damaged by them; also the wood-wasp, *Sirex noctilio*, L. in its chamber in a piece of solid wood; and a very large specimen of the fungus *Pholiota spectabilis*, Fr.

Mr. H. W. Andrews exhibited the following rare and local Diptera.

Argyramoeba anthrax, Schk., taken by Mr. P. A. H. Muschamp at Woodhouse, Leicester, in 1932; *Lophosia fasciata*, Mg., from a glass porch at Crowborough; *Ocyptera interrupta*, Mg., from the New Forest.

Mr. A. A. W. Buckstone exhibited a gynandromorph of *Polygonia c-album*, L. from Surrey; also a series of *Colias croceus*, Frery. of Dorking origin, bred and captured, and read the following notes.—

Colias croceus:—Bred from ova obtained from a typical female taken at Dorking, Surrey, August, 1936.

The larvae were placed in ordinary cages kept in a glass house and were fed on lucerne and red clover during the first and second instars, after which they were given red clover only. About half the larvae fed up fairly quickly and the first of these underwent pupation on 2nd October, the butterfly emerging on 18th October, and all had assumed the butterfly state by the 28th of the month. The less precocious larvae were each night, from 6th October, placed in a warm room and shortly commenced to spin up; the first butterfly emerging on 29th October, the last on 6th December. The same amount of variation appears in the males of both the early and late emergences, *i.e.*, the ground colour varies from very pale yellow to the typical colours, while the marginal bands vary from black to brownish, the latter colour being due to numerous yellow scales interspersed among the black. The ground colour of

the females does not vary to the same extent as does that of the males and the marginal bands are deep black in all specimens. The yellow spotting in these bands varies to the extent that in the specimens of the early emergence it is very slight indeed, while in those that emerged later it is fairly prominent but not so pronounced, however, as in typical specimens. The undersides of the hind wings of both sexes of the sixty specimens which were bred have the smaller discal spot either wanting or very much reduced in size.

Mr. S. N. A. Jacobs read a translation of a paper on the *Nepticulidae* by Herr Klimisch (Vienna) published in the Belgian Magazine "Lambillionea" in 1936. (See Trans.)

14th JANUARY, 1937.

Mr. M. NIBLETT, PRESIDENT, in the Chair.

Mr. Priest exhibited *Endromis (Dimorpha) versicolor*, L. bred from pupa on 6th December, 1936.

Mr. F. T. Grant exhibited the following Coleoptera:—

Leptura scutellata, Fb. bred in June, 1936, from a pupa taken from a rotten log in August, 1935; and the following rare or local species all taken at whitethorn blossom from 23rd May to 1st June, 1936, in the New Forest:—*Anaglyptus (Clytus) mysticus*, L., given by Fowler as "local"; *Molorchus minor*, L., "very rare," Fowler; *Grammoptera variegata*, Germ. (*analis*, Pnz.); *G. ustulata*, Schall. (*praeusta*, Fab.), both "rare," Fowler; *Tetrops praeusta*, L., "local," Fowler; *Leptura scutellata*, Fb., "rare," Fowler; and *Orsodacna lineola*, Pnz., "rare," Fowler.

Dr. G. V. Bull exhibited a very pale *Aglaia urticae*, L. bred from W. Kent, the pale colour possibly due to a scale defect.

Mr. T. R. Eagles exhibited the flower-heads of the clover, *Trifolium stellatum*, L., from the neighbourhood of Shoreham-on-Sea; and the "oyster" fungus, *Pleurotus ostreatus*, Jacq. on which species Mr. Donisthorpe had taken 10 species of Coleoptera.

Mr. Musgrave exhibited the Mecopteron, *Boreus hyemalis*, L., ♀ ♀, a wingless species, from Penn, Bucks, 7.xi.36, where it was emerging in large numbers. This appears to be a locality hitherto not recorded for it.

Mr. J. A. Downes then read a paper, "Fossil Insects." (See Trans.)

28th JANUARY, 1937.

ANNUAL MEETING.

Mr. M. NIBLETT, PRESIDENT, in the Chair.

The Minutes of the last Annual Meeting were read and passed.

The Report of the Treasurer, the Financial Statement, the Balance Sheet and the Council's Report for the past year were presented, read and approved.

The Officers and Council for the ensuing twelve months, 1937-8, were declared elected as follow :

President.—F. J. Coulson. *Vice Presidents*.—M. Niblett, F. Stanley-Smith, F.R.E.S. *Hon. Treasurer*.—T. R. Eagles. *Hon. Librarian*.—E. E. Syms, F.R.E.S. *Hon. Curator*.—S. R. Ashby, F.R.E.S. *Hon. Editor of Proceedings*.—H. J. Turner, F.R.E.S., F.R.H.S. *Hon. Secretary*.—S. N. A. Jacobs. *Hon. Minuting Secretary*.—H. G. Denvil. *Hon. Lanternist*.—J. H. Adkin. *Council*.—F. D. Coote, F.R.E.S., K. G. Blair, D.Sc., F.R.E.S., A. E. Tonge, F.R.E.S., S. Wakely, B. J. MacNulty, C. N. Hawkins, F.R.E.S., A. Bliss, H. W. Andrews, F.R.E.S., J. H. Adkin, L. C. Bushby, F.R.E.S.

The President then read the Annual Address and vacated the chair. The new President, Mr. F. J. Coulson, then took the chair and Votes of Thanks were passed to the retiring President, Officers, Council and Auditors for their services during the year 1936-7.

ORDINARY MEETING.

Mr. F. J. COULSON, PRESIDENT, in the Chair.

Mr. B. H. Crabtree, F.R.E.S. of Alderley Edge, Cheshire, was elected a member.

Mr. Hawkins exhibited a short series of the dark form of *Eurois* (*Aplecta*) *occulta*, L. and two preserved larvae, all of Rannoch origin and read the following note :—"This short series, consisting of eleven specimens and the two larvae, were reared during November and December last from 20 quite small larvae very kindly given to me during the Autumn by Dr. Bull, who had taken a female of this form at Rannoch towards the end of July and obtained ova. As I understand that other Members, who also tried to rear this species from the same source, met with considerable difficulty and had a

good many failures, the following note may be of interest for some future occasion. I am told also that specimens of this species, when bred *ab ovo*, are usually rather small, whereas these appear to be quite up to the average size of captured ones, five of the largest expanding $2\frac{1}{4}$ inches or more and others not much less. As to food, I found that the most satisfactory diet, so long as it was obtainable in reasonably good condition, was a mixture of Birch and Primrose leaves. A few larvae died but the rest continued healthy although they fed and grew very slowly. One or two outstripped the others and there were two or three laggards which, after a time, appeared to cease feeding altogether and wanted to hibernate. When the Birch became too bad, through the approach of winter, to be worth giving as food, I changed the larvae completely on to a diet of Dock (advised by Dr. Cockayne) and began to force them at a temperature of from 65° to 70° F. For this purpose they were placed in a large flat tin with a thin layer of potting peat at the bottom, then a few Birch twigs, and the Dock leaves (fresh every, or nearly every, day) laid over all. The tin was kept tightly closed, except when open for cleaning, etc., and was placed in a suitably warm situation with a recording thermometer near by. The advantage of the peat in the bottom was that it absorbed surplus moisture, helped to keep the larvae clean, and could be cleared out, thrown away, and renewed with ease, thus getting rid of all frass, etc., without any difficulty. The larvae, except one or two, which refused to be forced and died, now began to feed and grow very fast and by the end of October the most forward ones became full-fed and prepared for pupation. As each reached this stage it was removed to another, deeper tin nearly filled with the peat, and while still being kept warm, was left to pupate. None of the larvae made any cocoon, and all pupated in little smoothed hollows on the surface of the peat. One or two buried themselves but came up again. When the pupae were fully coloured (dark brown) and hardened, they were removed to an emergence cage and the temperature raised somewhat to about 75° F. A light sprinkling with water was given at intervals, usually in the evening, and emergence duly commenced on the 22nd November. The last specimen appeared on 3rd December. The moths usually emerged late at night, after 11 p.m., or in the early hours of the morning, but one came out in the early afternoon.

“The larvae were of two forms, one dull and indistinctly marked, the other with strong black shield-shaped marks all along the

dorsum and a distinct whitish medio-dorsal line. Of the larvae which became full-fed there were but three of the dull form, the others being well-marked. A preserved specimen of each form is shown and they have kept their colours well."

Mr. Turner exhibited male and female specimens of both *Morpho aega*, Hb. and *M. portis*, Hb., two brilliant species of Lepidoptera from S. Brazil. The male of the former is, perhaps, the most brilliantly coloured insect known, while the female is of sombre hue both above and below. In the latter species the female is only slightly less brilliant blue than the male, and the underside pattern includes a series of silvery stripes and large eyespots. Both species are said to be locally common; *M. aega* frequents forest paths on the lower slopes of elevated ground, while *M. portis* frequents ground adjacent to running water in the bamboo forests.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read 28th January, 1936.

By M. NIBLETT, President.

LADIES and GENTLEMEN. You have just heard the reports of your Council and Officers and I feel sure you will agree that the Society is in a satisfactory condition. Our membership has shown a small but steady increase during the past few years and it should be the endeavour of all members to swell the numbers. Attendances at our meetings have shown but little change, but I am sure that many members who rarely attend the meetings would find much to interest them if they came more often.

We have had, in addition to the very interesting papers read, a large number of exhibits, the value of some of which have been sensibly lowered owing to their owners not handing to the Secretary a note detailing their exhibit; it is impossible for the Secretary to make a complete list of exhibits without seriously retarding their circulation. This matter has been raised many times, but I wish to make this a personal appeal to each member to make a point of seeing that his exhibit is adequately labelled, and to hand in a note giving particulars of it. I might add that new members are not the chief offenders in this matter. A society such as ours depends very largely for its success upon the individual efforts of its members and it is hardly fair to expect a few of the members to provide all the exhibits, papers, notes, etc., which give us such interesting entertainment. I should like to see more members bringing forward exhibits, notes, etc., as their contribution to the well-being of the Society in which we all have so great an interest.

Many members are I believe under the impression that unless an exhibit is rare, or abnormal, it is not worth showing. This is an entirely mistaken idea, as a quite common object, if accompanied by a note of some interesting observation made in connexion with

it, may be of considerable value, and no naturalist worthy of the name can study the creatures in which he is interested without observing many things which others would like to hear about, so I ask those who have been diffident in the past to let us hear some of their experiences in the field of Nature Study.

Our late member Mr. G. E. Frisby of Gravesend, who passed away on May 6th last at the age of 72, joined the Society in 1919. He had been prevented from attending our meetings of late years owing to severe rheumatism ; he was a keen hymenopterist, and his valuable collection of Hymenoptera has now come into the possession of the Society.

I would ask you to stand for a few moments as a token of respect.

Having dealt with matters concerning the Society in general it now remains for me to give the remainder of my Address, which I may call "Some Observations on Plant-galls caused by Gall-Wasps (*Cynipidae*)."

I am afraid it contains little of interest to the majority of members present, but as it is the only subject of which I can speak from personal observations I trust you will excuse my choice.

SOME OBSERVATIONS ON PLANT-GALLS CAUSED BY GALL-WASPS (*CYNIPIDAE*).

I propose giving a summary of some of my observations on galls caused by Gall-wasps (*Cynipidae*), being notes of their occurrence, with some reference to the insects ; except when otherwise stated the localities referred to are all in the county of Surrey.

I have since 1923 made 276 excursions in search of plant galls in general, and have been able to make some observations of Cynipid galls in most instances. These excursions have varied from a short walk of a mile or two, to whole day trips when any distance up to twenty miles or so was covered. I have succeeded in breeding from the galls, but not without some difficulty, 54 species out of the 80 odd species supposed to occur in Britain. I will deal first with those whose activities cause galls on plants other than oak (*Quercus*).

Of the genus *Rhodites*, which is confined to various species of roses, the gall of *R. rosae*, L., "robin's pin-cushion," is usually to be found in abundance wherever wild roses grow ; the same may be said of its relative *Rhodites eglanteriae*, Htg. "the smooth pea," but the "spiked pea gall" caused by *R. nervosus*, Curt. is often very

difficult to find. I should say it is not quite so widespread as the other two and if the many galls I have gathered are fair samples of the whole, then it is not surprising the gall is frequently very scarce. I have kept the galls under varying conditions but the results were invariably the same, its inquiline *Periclistus caninae*, Htg. emerged in some numbers, also as a rule a number of Chalcids, but *R. nervosus* always failed to come out. In June 1934 from a gall, one of a number collected in September 1933, a specimen of *R. nervosus* emerged and again in May 1935, two specimens emerged from galls of the previous year. In June 1935 I bred several specimens of the Ichneumon *Orthopelma luteolator*, Grav. from *nervosus* galls; this species usually emerges freely from the galls of *R. rosae*, but this was my first experience of its inhabiting the "pea" galls.

It is not an uncommon thing to find very young galls caused by one or other of the *Rhodites* species upon the leaves at the end of the summer, often too late for them to have any chance of arriving at maturity, as it is not usual for Cynipids to hold over their egg-laying for any length of time after emergence it would almost suggest a second brood; this of course is not the case, it is due to the very late emergence of some of the gall-wasps. I have had *R. rosae* emerge in July, and specimens of *R. mayri*, Schl. emerge in August.

Diastrophus rubi, Bouché is the cause of swellings upon the stems of Brambles (*Rubus* spp.). I have only found this gall twice myself, although I have searched acres of brambles for it. The first gall I found at Toft, a few miles from Cambridge, was about two inches in length, and from it there emerged over 70 Chalcids, the other galls I found yielded nothing. I had a few specimens sent me from various localities in Surrey and Middlesex, but these were old galls. From a batch of galls sent me by a friend from Cambridge the Cynipid emerged freely in May and June. *Aylax papaveris*, Per. which affects the seed-capsules of the common red poppy (*Papaver rhoeas*, L.), I searched for without success until August 1928, when in a field near Newhaven, Sussex, where the plant was abundant, there were hundreds of seed-capsules galled; from those I took the gall-wasp emerged in the following May.

Liposthenes latreillei, Kieff., which causes more or less globular swellings on the leaves of Ground-ivy (*Nepeta hederacea*, Trev.) is, as far as my own observations go, very local. This gall has been rather scarce during the past few years, but in 1936 occurred in several localities in some numbers.

The galls of the genus *Isocolus*, which are confined to the Knap-weeds (*Centaurea* spp.), do not as a rule occur in profusion. *Isocolus scabiosae*, Gir. at the stem-base of *C. scabiosa*, L. is at times locally plentiful, but the colonies are usually widely scattered. *I. rogenhoferi*, Watch., which causes a swelling of the involucre bracts of the same plant is much more abundant, but as it cannot be seen unless the flower-head is pulled to pieces, is no doubt frequently overlooked. I have usually found at least a few in most localities, where its host plant occurs. *Isocolus jaceae*, Schr. is undoubtedly a very scarce insect; the larvae live in the achenes of *Centaurea nigra*, L. and *C. scabiosa* which they cause to swell considerably. From some thousands of flower-heads of the former plant I have bred 11 specimens of this Cynipid, these emerging in June and July, while *C. scabiosa* heads to the number of many hundreds have yielded one gall.

The genus *Aulacidea* contains several species, whose galls occur as a rule in fair numbers, but are usually rather local in their occurrence. *A. hypochoeridis*, Kieff. which causes swelling of the stems of the Long-rooted Cat's Ear (*Hypochoeris radicata*, L.), I have found in a number of localities in Surrey, but, considering the wide distribution of the host plant, these are comparatively few. The galled plants I find are usually in a compact group, and although the host plant may cover quite a large area it is rare to find the galled plants scattered. The insect I have found rather difficult to breed out and like all this group, the larvae are usually rather heavily parasitized by Chalcids. *A. hieracii*, Bouché, I have not had the good fortune to find myself, but numerous galls of this species have come into my hands through the good offices of several kind friends. The gall varies considerably in size and occurs upon the stems of several species of Hawkweeds (*Hieracium*). This species is undoubtedly local. I have carefully searched several areas where the host plant grows, without success. The gall-wasp emerges during May and June.

A. piggoti, Kieff., the galls of which occur at the stem-base of Goat's-beard (*Tragopogon pratense*, L.), appears to be not uncommon. I have usually found at least a few galls in most places where the host plant grows, but like all galls that occur low down on the stem, or upon the roots, it is necessary to search closely for them. The insects from these galls I have had emerge in June and July.

Phanacis centaureae, Forst. which occurs in the stems of *Centaurea nigra* and *C. scabiosa* is not visible externally, at least I have never

found anything to indicate its presence; I have found the gall in several localities and should say that it is rather plentiful where it occurs. My method of collecting the galls is to split stems of the host plant, and if there is any indication of the gall in the stems so split I gather a number from adjacent plants. As a large proportion of the stems so gathered have yielded quite a number of the Cynipid I naturally conclude it is fairly plentiful in that locality. The insects emerge in May and June.

Xestophanes brevitarsis, Thoms. and *X. potentillae*, Vill. are usually to be found in fair numbers where their host plants occur, the former on the roots or stem-bases of *Potentilla erecta*, Hampe. (Tormentil), occurring as far as my experience goes much more freely than the latter species does, upon the root-stock and runners of *Potentilla reptans*, L. (Creeping Cinquefoil). Both species emerge in May and June.

Taking next the Cynipid galls which are confined to the oak (*Quercus*), I shall refer to some of the more uncommon species, and also make some reference to fluctuations in occurrence, which have come to my notice.

Andricus callidoma, Gir. a bud gall of which, although never plentiful, one generally saw a few galls during the season, appears to have vanished from all the localities where I used to find it.

Andricus ostreus, Gir., "The Oyster Gall," a species which had been abundant for many years was scarce in the autumn of 1934, although in 1933 it was very plentiful as was its alternate generation *A. furunculus*, Bey., in the spring of that year; in 1935 it was very difficult to find any of the galls, but I was pleased to note that in 1936, although far from being abundant, it occurred in fair numbers in a number of localities.

Andricus glandulae, Schnk., I had found occurring in a few localities in considerable numbers for some years; in 1933 a very close search resulted in the discovery of a few galls; in 1934 and 1935 I was unable to find any after an intensive search, but in 1936 about a dozen galls were observed during two hours close searching, so it would appear that it is recovering.

Andricus xanthopsis, Schl. which I found in some numbers in a wood near Croydon in 1930 I failed to find again until 1936.

Andricus amenti, Gir. another catkin gall which I found in the same wood appeared to be gradually drifting across a section of the wood; this caused me to wonder what would happen when the edge of the wood was reached, as there are no oak trees beyond. I was

unable to find any of the galls in 1936 although the catkins were very plentiful. I am waiting with some interest to see what results next spring will yield.

Andricus solitarius, Fons. galls I have never found as a rule in any great numbers. It is as its name indicates "solitary." One has to search over a fairly wide area to find any number of the galls. I have collected what galls I could find over a period of about nine years but failed to breed out the gall-wasp, all I have had emerge being parasites or inquilines. During 1936 I was fortunate in finding this gall rather more plentiful than usual, I collected 46 in all, and from 26th July to 4th September insects emerged freely, comprising 43 inquiline *Synergi* and 8 Chalcids. I had almost given up hope when on September 20th I found a specimen of *A. solitarius* had emerged. I am apparently not the only person who has had difficulty in breeding this insect, as it appears that Mayr failed to get it, and that out of 199 galls Schlechtendal only managed to get four of the gall-wasps.

All the species of the genus *Neuroterus* appear to persist with but little change. I have noticed periods of local scarcity, but this has usually been balanced by a plentiful supply in other places. The spangle-galls occur as a rule upon the underside of the leaves, and one can usually tell if a leaf has galls upon it by the appearance of the upper surface, as at every point opposite to where a gall is attached there is a more or less circular patch of the epidermis very much lighter in colour than the rest of the leaf, some chemical action induced by the Cynipid larva apparently affecting the chlorophyll. Another feature in connection with the spangle-galls is the fact that, after they have fallen from the leaves in the autumn and lain dormant during the winter they swell appreciably early in the new year, during which period the larva matures and pupates, the perfect insect emerging from early March to the end of May according to the species.

Neuroterus aprilinus, Gir. which occurs in a bud is a rather difficult gall to find before the insect has emerged, being hidden by the bud-scales and maturing very rapidly. I have found the galls with the insect still in them from 22nd April to 5th May, and the empty galls from 10th to 22nd May. Upon one occasion I gathered a number of twigs with larvae in the buds on 2nd April, kept them in water, and succeeded in getting the gall and insect to mature, a few specimens of *aprilinus* emerging on 24th April.

I have found these galls on both *Quercus robur*, L. and *Q. sessiliflora*, Salb. in fair numbers as a rule. The localities where they

were found were widely separated, and I am of the opinion that this species is not at all uncommon, but is frequently missed, owing to the short period that is in evidence. After the insect has emerged, the thin soft walls of the gall rapidly decay or shrivel up. There is often only one cell in the gall, but I have found a fair number with two or three cells. As regards the galls of the genus *Diplolepis*, there appear to be definite periods of scarcity and abundance, this has been perhaps most apparent with *D. quercus-folii*, L. I found the galls of this species fairly plentiful in 1928, a few in 1929, plentiful in 1930 the peak year, fairly plentiful in 1931, but in 1932, -33, -34, -35, I failed to discover a single gall in any of the dozen or so localities in Surrey, where I had previously found it, but in 1936 it turned up again in considerable numbers in several localities.

Diplolepis disticha, Htg. I could usually find the galls of this species in fair numbers in several localities. Prolonged search in the autumn of 1933, -34, and -35 failed to disclose a single specimen of the gall, but in 1936 I found a few specimens in its usual habitat.

D. divisa, Htg. and *D. longiventris*, Htg. I have never found in abundance, but in most localities one generally came across at least a few specimens. I failed to find a single gall of either species from 1933-35, but in 1936 the latter species was quite plentiful.

Hartig experienced these cycles of scarcity and abundance, as he records in 1838 *D. divisa* was so rare that he was unable to discover a single specimen, but in 1840 it occurred in such immense numbers, that he collected 28,000 galls from which he bred about 10,000 of the Cynipid, and that in 1841 and 1842 the galls were quite as abundant.

The gall of *Trigonaspis renum*, Gir. I have found to be rather local in its occurrence, but usually plentiful where it does occur. It is very late in making its appearance upon the leaves but matures rapidly. I succeeded in breeding 6 specimens of this apterous species on 29th December, 1935, from galls collected in October, 1934. I had had numerous galls of this species each year for nine years, the only other insect emerging was an inquiline in April of 1934, from a gall of the previous year. Adler stated that this species remained in the larval state for two or three years. I now have galls collected in 1933 with living larvae still in them.

It is very difficult to arrive at a satisfactory reason for the rise and fall in the occurrence of different species of Cynipid galls; parasitism undoubtedly is one factor, but of several species, which have shown a marked decline in numbers or which I have failed to

find at all over protracted periods, numbers of galls I took immediately before the decline yielded a remarkably high percentage of the Cynipid gall causers. Again certain galls which are always heavily infested by either inquilines or parasites persist year after year in the localities where they occur, not always in great numbers, but regular search seldom fails to disclose a fair quantity; but I have observed many instances where colonies have been exterminated by the action of parasites.

Some of the oak frequenting species remain in the larval stage for two or three years, others which normally complete their life-cycle within 12 months sometimes lie over for another year; this might cause a seasonal scarcity, but the species that have shown the greatest fluctuations have been those whose life-cycle is completed in about 6 months.

I do not think that low temperature has very much effect upon the *Cynipidae* in general, as many species emerge in mid-winter and proceed to oviposit. After the very severe frost in the spring of 1935, I certainly found numerous specimens of *Neuroterus baccarum*, L. dead upon badly frost-bitten oak leaves and in their galls, but these were in all probability insects just emerged, or on the point of emerging, when their powers of resistance would naturally be at their lowest. That they were not all destroyed was proved by the fact that in the following autumn, galls of the alternate generation, *N. lenticularis*, Oliv., were, although not perhaps quite so plentiful as usual, well in evidence.

There is but little doubt that the *Cynipidae* are in a state of evolution. We have the non-oak galling species with no alternating generations and whose galls are of very simple structure, and with the exception of those affecting the Rose without inquiline *Synergi*. In the *Rhodites* group the males are certainly noticeably absent and many of the females are undoubtedly parthenogenetic. The rose-galls give support to the inquiline genus *Periclistus* whose larvae do definitely cause an enlargement of the galls they inhabit.

Then follow the *Cynipidae* of the oak, with their inquiline brethren, whose presence is frequently the cause of these galls not reaching their full size. The oak *Cynipidae* have alternating generations of sexual and agamic forms and their galls are often very complex in their structure. In this group there are many species which have only a single known generation, in which the male is unknown, the parthenogenetic females carrying on the race. In this group there are also sexual generations, with as far as is known at present no alternate agamic generation. There are also

several families of the *Cynipidae*, which are entirely parasitic upon other insects, and have no connexion with gall causing at all.

One does not expect such sluggish insects, as the *Cynipidae* are generally considered to be, to migrate from one area to another, but several instances have come to my notice where a colony of these insects have disappeared from one location and appeared in another some distance away. This was particularly noticeable with *Trigonaspis renum*, Gir. In a small wood I found the galls of *renum* to occur quite plentifully in the autumn for several years in succession, and the galls of its alternate generation, *T. megaptera*, Panz., in the spring. I then failed to find the *renum* galls in their usual location, but eventually found a small number at one end of the wood where I had never previously found any. The following year I failed to find either *megaptera* or *renum* galls in the wood; twelve months after, while searching a small patch of scrub oak about a mile distant from the wood just referred to, I found *renum* galls in abundance; this scrub oak I had had under close observation for some years, and am quite satisfied that no *renum* galls had occurred there during that period. Taking into consideration the locality and the situation of the oaks, I can come to no other conclusion but that the insects had migrated, presumably in the *megaptera* stage as it seems hardly possible that *renum*, which is an apterous species, could have covered the intervening distance. I was rather surprised to find these *renum* galls upon small scrub oak, as I was under the impression that the alternate *megaptera* galls were confined to the adventitious buds occurring upon the trunks of well grown trees, but have since discovered that they may be found at the base of stems of oaks only a few years old.

In conclusion, I would like to point out that there is still plenty of scope for research work in connexion with this group of interesting insects and their galls, there being many points concerning their biology awaiting solution.

I have only one more duty to perform before I vacate the chair and that is to welcome our new President, Mr. F. J. Coulson. He needs no introduction to the majority of you, but for the benefit of new members I would like to point out that he is a coleopterist of great merit. If he has the same co-operation and goodwill of Officers and Members (as I feel sure he will have) as I have received, he will look back upon his term of office with as great an amount of pleasure as I do on mine.

The Metamorphosis of Insects.

By J. A. DOWNES, B.Sc., F.R.E.S.—Read 27th January, 1936.

I am going to begin this paper by saying a few words about the change of external form in a growing insect; although I mean to deal chiefly with the lesser known internal changes.

An insect moults more or less frequently during its existence—that is, the old protective cuticle separates from the living cell layer, or hypodermis, which then proceeds to produce a new cuticle. When this is formed the old one, which has meanwhile been clinging around the insect, is split, and the insect walks out of it. But frequently the new cuticle is found to have developed in quite different form and consistency from the old, and this is the immediate cause of the change of appearance and external growth of an insect.

The primary divisions of the class Insecta are based on the degree of change undergone during growth. Thus

(a) *Apterygota*. No notable change: never attain to winged stage. (Silver-fish, Springtail, Collembola, etc.)

(b) *Exopterygota*. At each moult the wings and external genitalia become better developed, but usually there are no other important external changes. That is to say the young, or 'nymphs' as they are usually called, grow gradually towards the adult form without any large jumps. This group includes Bugs, Grasshoppers, Stoneflies, etc.

(c) *Endopterygota*. These hatch as a young form called a larva, usually not very like the nymphs of the Exopterygotes nor like the adults they are to become. The larva moults, usually several times, without any great change of form and then a further moult, which produces a very great change, occurs. This stage is quiescent and is called a pupa. The pupa then eventually moults, producing an imago, which is again of very different form. This group includes Lepidoptera, Diptera, Coleoptera, etc.

In this group the larva and adult are, as I have said, very unlike. The most universal difference is that the developing wings of the larva cannot be seen, as they are pushed into small internal folds of skin which are covered by the outer cuticle. (It will be remembered that in the Exopterygotes the wing rudiments are always external and obvious, as in the corresponding imago.) Usually there are also other differences from the imago, *e.g.*, a lepidopterous larva has biting mouthparts while an adult has sucking ones; it has prolegs on the abdomen; it has the cuticle of the thorax and abdomen quite soft, and body generally roughly circular in cross-section.

Now the condition in the Exopterygotes, *i.e.*, the gradual and

direct growth of young to adult, is quite certainly the primitive one in winged insects. The theoretical background to endopterygote metamorphosis is that the evolution of the young and of the adult has occurred along two diverging lines, instead of always in the same direction. That is, the young have become adapted to one mode of life and have developed the necessary structures, while the adults have become specialised in a quite different way. This divergence in structure and habits must be bridged somehow, and this is the function of the pupal stage. There is obviously a great physical difficulty in changing the configuration and build of the body, while retaining the organs sufficiently well developed for the animal to lead an active life, and so the pupal, or 'making over' stage, is almost necessarily quiescent.

So much for the external changes and importance of metamorphosis in insects. I will now say something about the less generally understood internal changes. Most people are acquainted with the pupa of a higher insect such as a moth or housefly; and this on being opened reveals a superficially formless mass, at least in its earlier stages. But the changes taking place can be understood if we start from a more primitive form and bear in mind the general significance of metamorphosis as mentioned above.

In the Exopterygotes the internal changes are parallel with the external ones. The young are hatched in a condition generally like the adult, and the various systems of organs simply grow towards adult size, without any essential change of form. A certain proportion of the cells are replaced during growth by new ones, and such replacement usually takes place while the animal is preparing to moult, but the dying off and replacement of cells is never sufficiently intensive to bring about a sudden structural change.

The internal changes of Endopterygotes are also roughly parallel to the more important external ones; in the larva there is a system of organs remaining constant in form and not developing towards the adult condition; then a sudden change in the pupa, when these organs are largely broken down and a more or less different imaginal set built up from the remains.

The degree to which these organs are broken down, and the method by which this result is attained, vary from Order to Order and are an expression, as also is the intensity of external change, of the degree of divergence in evolution between the larva and the adult.

But it should be remembered that, great as are the changes that occur at pupation, they are not a completely new event, without origin or parallel. As I have said, in the insects with incomplete metamorphosis there is a slight wearing out and replacement of cells at each moult, producing a gradual growth, and the change that take place on pupation in the higher insects is merely an intensification of this process, to compensate, so to speak, for the opposite tendency during larval life.

I will now describe some of the changes taking place in various insects to show their increase in complexity and their relationships to each other.

The Hemimetabola, those insects showing incomplete metamorphosis, need not be dealt with in further detail. Occasional replacement of cells in all tissues, producing a slight and gradual change of form, occurs throughout life; the tissues as a whole persisting from young to adult.

The simplest case which is known in detail among other insects is that of the Chrysomelid beetle *Galerucella ulmi*. The changes take place in the larva that is resting before pupation and during the pupal period. The outer, cuticle-secreting layer of cells, *i.e.*, the external ectoderm, is found to persist from the larva to the adult, but part of the nucleus and part of the cytoplasm of each cell separates from the major portion, dies, and is carried away as waste matter by certain wandering cells called amoebocytes. MacBride interprets this process as a *rejuvenation* of the ectoderm cells. The mouth and anal regions of the gut also behave in this way, but the middle region, which is formed in the embryo in a quite different way and is of endodermal origin, is completely broken down and rebuilt from a mass of cells lying, in the larva, at each end of this region. The destroyed larval tissue is again carried away by amoebocytes.

Most of the muscles and the malpighian tubules undergo a similar complete breakdown and removal by amoebocytes, but the adult tissues are in this case built up from certain cells that were scattered throughout the larval tissue, instead of from a cluster of cells at one end of it. Such a cluster of undifferentiated cells, which during the pupal stage differentiate to form a functional tissue, is called an *imaginal disc*.

The most extreme changes known in insects take place in the flies of the *Musca-Calliphora* group, and in the Chalcids (parasitic Hymenoptera). In *Musca* almost every system of organs is destroyed, except the central nervous system, and new ones are built up from imaginal discs.

The outer cell-layer—ectoderm—is destroyed almost all over the body, and is rebuilt in the thorax by six imaginal discs corresponding in position to each of the thoracic legs of the adult. These masses of cells are not very near the body-wall, but lie among the internal organs and are connected to the body wall only by long strings of cells. At pupation these strings shorten and the imaginal disc comes towards the surface of the body, where it forms the rudiment of the leg; parts grow upwards and downwards to reform the body-wall. A similar proceeding takes place in the abdomen but the discs are not so large there as they have only to reform the body wall and not to construct legs.

The gut is completely destroyed also, instead of partly persisting

and partly being reconstructed as in *Galerucella*. At each end of the mid-gut are large imaginal discs, which replace the portions before and behind them, and also contribute to building the mid-gut itself. This latter, however, is chiefly reformed from many smaller discs scattered along its length.

Muscles and malpighian tubules are completely destroyed; and as in *Galerucella* replaced by cells scattered through their substance.

In most of these organs the breaking down of tissues is accomplished by the amoebocytes previously mentioned. These engulf and carry away portions of the larval tissue until practically none remains.

Other organs, such as the tracheal system and the salivary glands, are also destroyed and replaced in *Musca* during the pupal period, but the ventral nervous system seems to survive almost unchanged—this is the only tissue in these extreme cases that persists as such from larva to adult.

Most other insects that undergo 'complete metamorphosis' show internal changes intermediate in intensity between those just described. We may sum these up by saying that in *Galerucella* the ectoderm, as a whole, persists from the larva to the adult. the muscles partly survive, and partly are destroyed and rebuilt. the gut has its middle or endodermal part completely replaced, and its fore and hind ends survive.

while in *Musca*, the ectoderm is wholly replaced, and some new regions such as legs are built up.

the muscles and gut are also wholly replaced, the only persisting tissue being the central nervous system.

Probably Lepidoptera and Hymenoptera are as a whole intermediate between these two types, while Coleoptera and Neuroptera are more like *Galerucella*, or may have even less change.

The process of building up the new tissues during the pupal stage is somewhat similar to that taking place in an embryo. The imaginal discs are composed of undifferentiated cells, that is, cells of no particular character (such as gland, or muscle, or nerve-cells) and when the time comes they arrange themselves in the form the new organ is to take and then differentiate and become specialized for their particular function.

The energy, necessary for these changes, is derived, of course, from the food taken in by the larva, but more immediately from the material stored in the fat body and from the products of the breakdown of the larval tissues. This activity produces a certain amount of waste matter, and this is voided as the drop of fluid—the meconium—which insects expel soon after emerging from the pupa: this fluid consists largely of uric acid.

***Cosmia (Xanthia, Mellinia) ocellaris*, Brkh.**

By F. STANLEY-SMITH, F.R.E.S.—Read 26th March, 1936.

INTRODUCTION.

Last year [1935] my wife, our near neighbour Mr. Quibell and myself attempted to discover for ourselves the wild life-history in this country of *Cosmia ocellaris*, Brkh., the Pale Lemon Sallow. We failed, but these notes, showing how far we got, have been put together in the hope that they may be of some help to anyone working in the same direction.

The preliminary information has been compiled from the sources quoted to assist members who have not got the books mentioned on their shelves. Lack of the larger standard works explains the obvious omissions.

NOMENCLATURE.

Worsley Wood in "Ent. Mo. Mag." April 1915, discusses the nomenclature and concludes that it should be *Xanthia ocellaris*, Borkhausen. South uses the name *Mellinia ocellaris*, making it congeneric with *gilvago* only in the British list; but he does not give authority for his names.

Seitz "Palaeartic Noctuae" Vol. III. p. 155 (for which the group was I believe written up by Warren) uses the name *Cosmia ocellaris*, Bkh., so I suppose for the present we must regard that as authoritative.

DESCRIPTION.

Imago. The only difficulty (in this country at any rate) is to distinguish this species from *C. gilvago*, Esp. Wood says that the outline is no guide as many light forms of *gilvago* are as sharply angled as any *ocellaris*. The best distinctive characters in *ocellaris* are the pale nervures and the light reniform dot—but even the latter is not always present. Wood mentions a short fine discoidal line in the hind-wings of vars. *intermedia* and *gilvescens*, saying it is frequently indistinct in non-British specimens. It is difficult to find in many of our British ones.

Larva. The following are three independent descriptions of the larvae. We are unable to say definitely to which instars they relate, as we were breeding so many together we found it impossible to note the changes. When about $\frac{1}{4}$ inch long ours were generally brown in colour like those of *gilvago* or *Amathes circellaris*, Hufn., moderately deeply segmented and tapering towards head and tail.

A thin white medio-dorsal line is contained in a band of somewhat darker brown than the ground colour, with a narrow white side line. The narrow white spiracular line has above it a broader dark brown line. The ventral surface is a lighter ochreous brown. The head is ochreous brown with two black marks on top. The first segment is about the same colour as the head.

When $\frac{3}{4}$ " long the larvae still taper slightly at both ends and are deeply segmented. The general colour is grey brown above, and transparent greyish underneath. There is an interrupted narrow white medio-dorsal line, except on the last three segments, edged on both sides by a broader dark brown line, getting darker on the last three segments, where it is broken into almost black blotches on either side. There is a wavy white spiracular line in continuous crescents. The head is light brown with two black spots behind.

When about 1" long, the larvae are generally cylindrical, tapering slightly towards the head, which is small. The general colour is now darker than before, a dark olive brown, shading somewhat to greenish towards the head, and slightly mottled all over. There are traces of an interrupted white medio-dorsal line in a broader interrupted dark brown line, broadest on the penultimate segment. There is a faint brown dotted line on each side. The spiracular line is darker brown containing black spiracles, with a wavy cream coloured line below it. The underside is a greenish-grey, the head is light brown and notched on top, with slightly darker brown spots. The first segment is black, broken by two white cross lines.

The full-grown larva is about 2" in length.

The larva constructs a thick silken cocoon coated with the material in which it pupates. It is said to rest in the cocoon for a period before changing to pupa.

Pupa. Mr. Hawkins has supplied the following note on the pupa. He says:—"I have dehisced pupae of this species bred from larvae received from both Mr. Worsley Wood and Mr. Stanley-Smith. The pupa is very like that of *C. gilvago* and, as in nearly all members of the "Sallow" group, is thin in texture and easily distorted during emergence of the imago. So far as my experience goes however, the pupa of *ocellaris* is decidedly larger than that of *gilvago*, is rather more reddish in tint and slightly stronger in texture. In both species the cremastral armature consists of two short, moderately strong, usually convergent spines, curved ventrad. The cremaster itself in *gilvago* is knob-like and strongly sculptured with ridges and irregular network; in *ocellaris* it is rather broader in proportion and varies somewhat in shape, *e.g.*, in my pupae bred from Mr. Worsley Wood's larvae it is nearly as knob-like as in *gilvago* but in those bred from Mr. Stanley-Smith's larvae it appears to be shorter and to form less of an excrescence at the end of the pupa. Moreover in my pupae of *ocellaris* from Mr. Worsley Wood's larvae the two cremastral spines are more definitely blunt and knobbed than in

those from Mr. Stanley-Smith's larvae; though in both cases they do not taper so much as in *gilvago* where they appear almost pointed."

VARIATION.

According to Worsley Wood's article, the varieties of the typical form are

- ab. *lineago*, Gn., dark grey,
- ab. *palleago*, Hb., pale, without any red,
- ab. *carneago*, Warren, pink,

while the *gilvago*-like forms are

ab. *intermedia*, Habich, with the reddish grey ground typical of *ocellaris*, and the speckled fringes of *gilvago* (which neither *ocellaris* nor ab. *lineago* have), and

ab. *gilvescens*, Worsley Wood, with a pale buff ground.

He says that ova from wild caught typical *ocellaris* bred true to type, while ova from ab. *intermedia* produced 50 : 50 ab. *intermedia* and typical *ocellaris*, except in 1910 when a few ab. *gilvescens* were produced; he thinks 3 : 3 : 1, *ocellaris* : ab. *intermedia* : ab. *gilvescens*.

FOOD PLANT.

Again quoting from Worsley Wood's notes, the pabulum in the Thames Valley was the male hybrid *Populus serotina*, which Johns says is an introduced species; the Black Italian poplar, a cross between our *Populus nigra*, L. and the American Black Poplar, *P. deltoidea*. Other food plants in captivity he gives as common elm, ? sallow and aspen, apple, plum, red currant and raspberry; but he says there is no definite evidence in the wild state of them feeding here on anything but poplar. He says Treitschke gathered wild larvae on *Artemisia campestris*, L. and other low plants at Darmstadt.

Our own experience we will give in the course of our notes on breeding, but I might mention here that none of us tried *Artemisia*.

BRITISH HISTORY.

The imago was first known in this country in 1893 when three were captured in the Thames Valley. The rare captures in subsequent years down to 1907 are quoted in South, and it is now interesting to note that the localities of these early captures included not only the Thames Valley, but North Kent and Suffolk. Incidentally South said that the larva had not been detected in this country.

Tutt, in his "Hints" does not quote the source of his notes. In Vol. II. he says that the insect has been taken at sugar and light in many localities in September, from which one might think it was almost as common as say *Monima* (*Taeniocampa*) *stabilis*, View. Another note says it occurs pretty regularly in a locality not far from Wilmington in Kent, mixed with *M. gilvago* and *Tiliacea citrargo*, L.

It is now fairly generally known that it occurs on the old Black Poplars in a district of West Suffolk, and that it has been fairly plentiful there in the last few years.

OUR OWN INVESTIGATION.

Soon after we had started our investigation, I asked one of our leading authorities how to find larvae of *C. ocellaris* in the wild, and was told that if one could gather catkins from the top of poplars in the known locality we should find them, but of course that was impossible. On 4th April 1935 we went to the Suffolk locality where we had taken imagines at sugar the previous autumn on *Populus nigra*, to gather fallen catkins. As we entered the district we could see we were too early, as the catkins were only just bursting their sheaths. When we arrived on our ground, to our horror we found most of "our" trees had been felled, and we thought our investigation was frustrated at the outset. The trunks of the grand old trees, about 70-80 feet high, had been removed, but the tops and branches, left where they had fallen, continued to live, and were just exposing their catkins. After our first dismay, we realised that we had struck a wonderful opportunity of searching the topmost branches of mature poplars, where, according to report, the eggs were most likely to be laid. We searched in vain the buds, twigs, and particularly in the axils for eggs or traces of shells. Nevertheless we cut large numbers of flower-bearing twigs from the tops and sides of most of the felled trees to take home. Before leaving we explored the neighbourhood, and to our relief found a long avenue of standing poplars. We learnt later that other collectors also discovered the felled trees, grasped the opportunity, and eventually considerable numbers of *ocellaris* were bred from this source last year.

At first we kept the twigs in boot boxes, and on 10th April Mr. Quibell found three larvae of sorts on his catkins, and transferred them to glass topped tins. We then stood up all our twigs in wet sand in a bath (which they filled) to promote the growth of the catkins. On 22nd April mould was getting very bad, so we started searching for larvae. We had found four or five on the catkins before my wife discovered that the larvae were concealed in the otherwise empty sheaths, which, squeezed at the ends between finger and thumb, opened to expose the inhabitants. On 24th April my wife and I spent five hours finishing the search of our bath, by which time we had found perhaps one hundred Noctuid larvae of the *Xanthia* type, a few *Operophtera* (*Cheimatobia*) *brumata*, L., *Oporinia* (*Oporabia*) *dilutata*, Schiff., and another Geometer not identified, as well as hundreds of "grubs," the last mostly down in the damp sand. Mr. Wakely bred some of these "grubs" and later got them identified as the Coleopteron, *Dorytomus longimanus*, Forst. We put the debris back in boot boxes, and found at least another score of larvae therein subsequently.

The larvae we divided, sleeving thirty on our own very juvenile black poplar, putting batches with Lombardy poplar leaves in muslin covered tins, and enclosing others on sprays of Lombardy poplar in glass cylinders, giving all batches what catkins and sheaths we could. We noted that under these conditions they still hid by day in the sheaths, but fed on poplar catkins and leaves by night.

You will understand that although we had hopes by this time of the identity of the larvae, we were still by no means sure. From this stage we worked in two ways, in captivity experimenting with food plants in the hope of getting clues to the whereabouts of the wild larvae, and using our field observations to assist in feeding the captive larvae.

On 28th April we ran over to the locality in daytime, actually going to the new found avenue on this occasion. All catkins had fallen from the trees but no leaf buds had yet broken. Despite the general appearance of bareness of the ground, closer observation showed a fair supply of grass and low growing plants, including dandelion, dock, chick-weed, some forget-me-not, plantain, groundsel, rose-bay willow-herb, stinging-nettle, white dead-nettle, burdock and ground-ivy, as well as plenty of privet. We searched on and under the low plants in vain, but the three of us in an hour found nine *ocellaris* larvae concealed in the sheaths attached to fallen catkins, thereby definitely proving that some of the larvae do fall about the same time as, and probably with, the catkins or sheaths. Others were found in the sheaths and on catkins attached to a felled tree, including one in the first instar, a dirty white with black head and black thoracic plate.

At home we tried the larvae on dandelion, dock, groundsel, chick-weed, white and red dead nettle. There were traces of eating on the dandelion, but certainly no enthusiasm was shown for any of the plants, and, when we put in fresh poplar leaves the low plants were entirely ignored. About this time we noticed that the larvae sleeved out on poplar were backward compared with those being fed indoors, so we brought them in. By this time the glass topped tins were being replaced by breeding cylinders. As the staple diet, we used Lombardy Poplar sprigs throughout.

On 25th May after nearly three weeks of very cold weather with strong northerly or easterly winds, during which vegetation moved but slowly, and with severe night frost on 16th and 17th May, which killed most of the young leaves on oak, ash, etc., we worked on our original site from 9.30 p.m. till midnight. This time we discovered "our" larvae on the ground, either between layers of last years dead and matted poplar leaves, of which there was a thick carpet, or between the leaves and the earth. There were no dried catkins close to the larvae; there were small sprigs of ground ivy, a small vetch, and a fine goose-grass close to some of them, with very

few blades of grass. It looked as if the ground-ivy might have been slightly eaten. One larva was undoubtedly curled up between leaves and not feeding, about $\frac{1}{2}$ " in length, light brown in colour and with dark coloured food in its first half. This raised the question whether it had been feeding on the dead leaves. There were low privet bushes near, but we could not detect any signs of eating thereon. We searched the poplar trunks, searched and beat the low poplar boughs, now carrying a few young leaves, searched and beat the privet, and my wife in particular crawled about for an hour or more examining the low-growing plants, but all in vain. Beating birches and hawthorns was equally useless. Two of the larvae found that night were segregated and eventually produced *ocellaris* imagines.

In the cages the larvae fed by night only, working down into the pupato by day. It was generally an hour or more after dark before they came up to feed. Particularly as they approached the full-fed stage they did not all feed every night. If possible, they remained concealed even when feeding, and dived to cover away from light. We tried the larvae found on 25th May with dead poplar leaves, but they starved for three days; then we offered fresh poplar leaves, which they soon attacked. We put low growing plants, to wit, narrow-leaved plantain, sorrel, dock, and dandelion in some cages as well as poplar sprigs, but the low plants were untouched three days after. On 29th May it suddenly occurred to one of us to try privet, and we found they ate that freely, in fact they were quite indiscriminate between that and poplar. Mr. Quibell fed some for a week on dandelion alone, but they still chose poplar when they had a chance.

On 2nd June we went to the avenue site again, beat the poplars, got nothing but *Calymnia trapezina*, L. and *O. dilutata*, and searched and beat the privet in vain. By this time our visible captive larvae were dwindling in numbers, so evidently they were going down prior to pupation, and it was useless to continue the search any longer in the wild.

My wife sorted through our own cages in August and counted 140 cocoons, produced from 146 larvae. We then had to take them away with us in the caravan, but, despite the jolting, well over 100 imagines of *Cosmia ocellaris* emerged between 14th August and 13th September. Mr. Fryer told us they were very different in this respect from *Ochria aurago*, Fb. pupae, which travelled badly. The only other insects bred out were a few *Amathes macilenta*, Hb. including the var. *obsoleta*, Tutt, *Dyschorista suspecta*, Hb. and *Plastenis subtusa*, Fab.

CONCLUSION.

So ended for the season our attempt at discovering the complete natural habits of these larvae. We have since discussed the problem

with many collectors, and to us, in the light of their feeding habits in captivity, we think the most likely theory is that those that survive in the wild desert the catkins before they drop and bore into the high leaf buds. Against this is the fact that in the early stages they seemed rather to prefer catkins to leaves, so long as the former could be supplied. One theory is that the larvae fall with the catkins, and then climb back to feed on the topmost leaves: we reject this for want of evidence, and on the score of impracticability, since the catkins are mostly blown down to some distance from the tree. The theory that they resort to low growing plants we were unable to confirm, despite the fact that one or two of the larvae found on the ground on 25th May were about three parts fed. It is moreover noticeable that the wild imagines are generally smaller than bred ones.

COLLECTING.

As is commonly known, the imagines are attracted to sugar on the poplar leaves, but not on the trunks. In 1934, late in the evening, when sugar was ceasing to call we noticed some sitting on the yellowing leaves of the trees. On 21st September, 1935, about a week after a gale, we went to the ground to get females for eggs. At first fair numbers attended the sugared leaves, but by 9.p.m. sugar was practically deserted. Thanks to the tip from Messrs. Mellows we then found them in scores on the decaying (? fermenting) leaves on fallen poplar branches. Other lepidoptera, *e.g.*, *Noctua glareaosa*, Esp., *Ochria aurago*, Fb., and *Phlogophora meticulosa*, L., were on the same leaves. There were none on similarly situated oak leaves. One had only to plant a lamp in a fallen poplar branch, to get as many *ocellaris* as one could want.

From that night's work we selected females for ovipositing; stimulating them with whisky, rum, or sherry, on sugar. One or two laid a few eggs in chip boxes: one about a score in a breeding cylinder; several failed; and the last one, sleeved out on a young poplar for the second time, with catkin bearing twigs tied on, just laid in time for the eggs to be shown at our last Annual Exhibition.

A Contribution to the Genetics of *Monima* (*Taeniocampa*) *incerta*, Hufn.

By E. A. COCKAYNE, D.M., F.R.C.P.—*Read 23rd April, 1936.*

In 1934 Mr. P. Bainbrigge Fletcher took a very pretty female of *Monima incerta* at Chiddingfold. The eggs were divided, and Mr. C. N. Hawkins and I each had a third. The female had a pale silvery grey ground colour with a few darker grey strigae, while the transverse band, submarginal marks, and posterior halves of the stigmata were red. The hind wings were grey. The F1 generation was separable into dark and light forms, but not so clearly as I could have wished. I bred 36 dark, 35 light, and 3 intermediate specimens.

The dark ones were much suffused with rich reddish brown and had the transverse band, submarginal marks, and posterior halves of the stigmata darker, but there were grey scales especially along the costa and inner border, in the anterior halves of the stigmata, and in the marginal area. The light ones fell into two main groups, about equal in numbers. Some had the same silvery ground as the female parent, with the markings similar, but a little darker and browner. They resembled Barrett's fig. 1g, Pl. 211, but the markings were reddish instead of blackish brown.

Others had some light red scales mixed with the grey ones in the ground colour and the markings and strigae were paler and redder. Two had a smoother and darker grey ground and one of the doubtful ones also had a smooth appearance, and a medium red-brown ground.

Assuming that dark is dominant to light, I paired two of the light ones. The female was like its mother, but had a few red scales in the ground colour, and the male had a good many red scales mixed with the grey and the markings were rather stronger and darker red. I expected to get a brood showing both parent forms without any dark ones.

The batch of eggs was small and the larvae did badly, so that I only got 23 pupae, and from these only 12 moths emerged, but the forms obtained were unexpected. There were 4 males, one crippled, with the ground colour entirely pale red and the markings darker red, the forewings resembling Barrett's fig. 1b, Pl. 211 (? ab. *subcarnea*, Warren). The hindwings in three of these were pale reddish owing to an admixture of pale red instead of grey scales. Another male was much darker red with grey hind-wings. Another was darker than either parent with reddish brown ground colour, and was like one of the intermediates of the F1 generation. Three

were similar to the male parent, but with fewer red scales in the ground colour and less heavily marked. Three more were not unlike them, but looked darker owing to the strigae on the ground colour being more numerous; two of these had a good many red scales mixed with the grey ones in the ground colour, whilst the third had scarcely any.

The result agrees with the expectation that dark is dominant to light, but the interesting fact, which stands out, is the appearance in the brood of very red moths, unlike any of the F1 generation. It seems probable that pale red is recessive to pale grey ground, but the ratio of red to grey is too high. If those in the F1 generation with an admixture of pale red scales in the ground colour are heterozygous for pale red, the male parent is clearly one of them, and it is possible that the female parent is a poor example of the same form. If this is so, we should expect in the F2 generation one pure grey, two with some admixture of pale red scales, and one pure red. Actually the proportion of red moths is too high, for there are six showing more red than grey and six showing more grey than red. It is also difficult to account for the appearance of a moth darker than either parent. Although the results are most inconclusive, so few breeding experiments have been undertaken with *Noctuae*, that I venture to bring them to your notice.

Some Notes on the Breeding and Genetics of *Erannis (Hybernia) defoliaria*, Clerk.

By C. N. HAWKINS, F.R.E.S.—Read 23rd April, 1936.

The following brief notes are, unfortunately, very incomplete, and were it not for the fact that little work appears to have been done on this species, I should hesitate to publish them. The breeding was begun as the result of finding a melanic male *in cōp.* with a non-melanic female at Chingford on 17th December, 1932, and I am afraid it was carried out at first in a rather haphazard fashion, more out of idle curiosity to see what would turn up, than for any other reason, though later special pairings were obtained and more care was taken.

During the season 1933-34 I had three objects in view:—to devise a satisfactory method of keeping the pupae (one of the greatest difficulties with this species); to obtain, if possible, an all-melanic strain; and to produce some good, bred, melanic specimens for my collection: while during last season (1934-35) breeding was done solely with a view to producing a certain form of melanic of which really good specimens turn up very rarely in the wild state. The form in question is obviously a melanic ab. *obscura*, Dahlström, but has the whole of the forewings, outside the normal blackish or deep brown outer cross-bands of that aberration, a clear cream colour entirely free from melanism, and there is a fair amount of white scaling scattered throughout the melanic area. During the course of some 9 or 10 seasons' search in various parts of Epping Forest I, personally, have come across but two specimens of the form, and of these one only is a really fine example.

Melanic ab. *obscura* are, of course, of frequent occurrence, but they are usually more or less affected all over by the melanism. The modification which has the melanism restricted as mentioned above, seems to be definitely rare.

From what has already been written it will be realised that during the first two seasons no attention was paid to the pattern underlying the melanism. Indeed without prolonged preliminary interbreeding to isolate the various melanic and non-melanic forms as pure strains no amount of attention can be of much value since it appears impossible to distinguish the females corresponding to the male forms. The females, so far as I can see at present, are simply melanic or non-melanic, and beyond that one cannot go. It is true that last season I bred with a view to producing a particular melanic form, but that was because the results already obtained showed that I had melanic *obscura* in my strain, and I hoped to be lucky enough to pick a corresponding female from which to breed.

As already stated, I began with a pair taken at Chingford on 17th

December, 1932, the female being non-melanic and the male melanic. Unfortunately, although I am convinced that male was duly labelled and put aside for reference, no trace of it can be found now, so I fear it must have been carelessly either thrown or given away. My only note about it is that it was 'melanic' and I have no clear recollection as to its underlying pattern, though I think it was one of the plainer forms and not a very black one at that.

At any rate ova were obtained and a considerable number of pupae reared. The larvae were allowed to pupate in a large flower pot of earth and were left undisturbed to await emergence, the earth being well damped at frequent intervals to prevent the pupae drying up. The result was extremely disappointing and consisted of 2 melanic females, 4 non-melanic females, and 2 non-melanic males (1 ab. *holmgreni*, Lampa., and 1 ab. *obscurata*, Stdgr.), all the remaining pupae died.

The two melanic females emerged on the 18th and 23rd December, 1933, respectively, and on this latter date I paid another visit to Chingford, where I took, amongst others, a very black male which has however chequered cilia to the forewings and faint traces of underlying cross bands.

This male was paired with both the bred melanic females, and a considerable number of ova obtained. The ova of the two females were not kept separate. From these ova 70 male and 18 female pupae were eventually bred, and as the results for the previous year had been so poor, it seemed advisable to try a different method of dealing with them. The larvae had pupated in ordinary potting peat contained in a large biscuit tin and on this occasion, so soon as it seemed likely that all had changed, they were turned out, removed from the peat, and placed in a $3\frac{1}{4}$ inch glass topped metal box where they nearly covered the bottom. In this they were kept shut up without any added moisture, in a cool room until late October, when they were again placed in peat in a large flower pot already partially filled with sandy earth and well damped. The pot was covered with lino and stood in a saucer of water and the surface of the peat was sprayed at intervals. The pot was kept in a covered shed in the garden where it would be subjected to more or less natural temperatures.

The first imagines, 2 males, came out on the 28th November and emergences continued until the 15th December, when the last male appeared.

Of females, the first emerged on the 2nd and the last on the 12th December. The greatest number of individuals to emerge on any one day, was 8 males and 1 female on the 6th December, but 5 or 6 came out on several days. The total number of imagines bred this time was 50 males and 13 females and all were melanic. Of the males 8 only were more or less severely crippled, the rest being perfectly developed.

Amongst the perfect males 27 had chequered cilia and most of these showed distinct traces of the underlying *obscura* form in the paler marginal areas and scattered white scaling in the central portions of the forewings, but one is so black as to entirely obscure all traces of pattern except in the fringes: the remaining 15 had the cilia plain, or at the most with faint traces of one or two chequer markings only, and these are much more brown in tone without any white scaling and no clear indication of cross bands on the forewings. These are probably melanic ab. *holmgreni* and/or melanic ab. *obscurata*.

I have no note about the pattern of the cripples, which were, unfortunately, thrown away. As there was obviously an ab. *obscura* strain in the brood an attempt was now made to breed the rare pale outer-area form referred to before, and for this purpose a good, pale *obscura* example of the male was obtained on the 8th December, 1934, at Wimbledon Common, which was paired with one of the 13 bred melanic females. It was, of course, a pure gamble since, as has already been said, it appears impossible to distinguish the females of one form from those of another whether in the melanic or non-melanic groups. This pairing produced just over 400 ova which were divided about equally between Dr. E. A. Cockayne, Dr. H. B. Williams, Mr. H. Worsley Wood and myself. Unfortunately owing to the eggs hatching earlier than Dr. Williams expected and before his food plants were ready, he lost the whole of his batch. However as I had been more fortunate in having food available in time I passed over to him a further lot of 60 young larvae and late ova retaining some 40 only for myself which should have been sufficient for my purpose if I was on the right track.

Whether however it was because the food-plants were very heavily infested with Aphids or from some other cause, I cannot say, but, in the event, I obtained but 15 pupae from my lot of ova. These were treated in the same way as had proved so successful the previous year and from them, during late November and December, 11 imagines were bred, 9 males and 2 females. 6 males and 1 female were melanic and 3 males and 1 female non-melanic. The non-melanic males are of the form *progressiva*, Haverkamp, but with slightly chequered cilia to the forewings and more or less distinct traces of a dark band beyond the discal spot on the hind wings. The melanic males, judging from the presence of darker cross bands on the fore-wings of all, the brownish tint of three of them, and the presence of some white scaling on the central area of the fore wings in the other three, are equally divided between melanic *progressiva* and melanic *obscura*, and all have chequered cilia to the fore wings. For some reason the percentage of perfect specimens was not nearly so good on this occasion, and 4 of the melanic males and one of the non-melanics were more or less crippled through failure to expand properly. Curiously enough the crippling seemed

to affect the *progressiva* form chiefly, since among the melanics it was that form which was worse developed, while the only imperfect melanic *obscura* was very slightly influenced.

Although none of the melanics was of the extreme pale-outer-area form desired yet one of the melanic *obscura* definitely approached it, and possibly if the melanic female of this brood (assuming it to have corresponded to the melanic *obscura* males) could have been paired with an ab. *obscura* male and the strain carried on for yet a further generation the wanted form might have turned up, but this, unfortunately, could not be done owing to lack of a suitable male at the right time. From an examination of my four dead pupae (all males) of this brood it appeared that 2 would have produced melanics and 1 a non-melanic while the fourth had not developed. Pattern was not distinguishable. For some reason, all those who had ova or larvae of this brood had poor results from them.

Dr. Cockayne bred a single non-melanic female but no males, and subsequently found 6 dead pupae. On examining the latter I found that four contained well developed non-melanic females, one a fairly well developed non-melanic male (form indistinguishable) and one an undeveloped female. Dr. Williams bred 8 melanic and 2 non-melanic females, and no males. In addition he had 7 dead pupae which I found to contain 5 melanic and 2 non-melanic females. Mr. Worsley Wood bred 5 crippled melanic males (one of the ab. *obscura* form and 4 of the *progressiva* form) but no females and he informs me that he had a number of dried up pupae which he opened without being able to get any indication of form, and that all were males. The actual known results of the 1934 pairing between the bred melanic female and the caught ab. *obscura* male were:—4 melanic ab. *obscura* males, 7 melanic ab. *progressiva* males, 2 melanic male pupae (form indistinguishable) = 13 melanic males; 14 melanic females; 3 non-melanic ab. *progressiva* males, 2 non-melanic male pupae (form indistinguishable) = 5 non-melanic male; and 10 non-melanic females. Total, 27 melanics and 15 non-melanics. This was a very disappointing result from over 400 ova and obviously the mortality in the brood, from one cause or another, was far too high to allow any conclusions to be drawn. The appearance of the ab. *progressiva* form at this stage however is interesting and suggests that it may be a combination of ab. *obscura*, Dahlström, and either ab. *holmgreni*, Lampa, or ab. *obscurata*, Staud. In the circumstances it seems best merely to record the above facts without discussion in the hope that when further work has been done on this species they may fall into place and assist in disentangling what is undoubtedly a complicated and somewhat difficult subject.

A Short Introduction to the British Dragonflies.

By A. F. O'FARRELL.—*Read 24th September, 1936.*

This paper is really no more than a series of collected notes on the British Odonata, but I hope it may serve as some kind of introduction to the Order.

I do not propose to say much about Classification. That which I use I have taken from Tillyard's work on "The Biology of Dragonflies." I have passed round an exhibit containing most of the common species likely to be met with in the South of England, and this will show the way in which the Order is divided up far better than any description of mine. Perhaps, however, I had better give some account of the distinction between the Sub-orders, of which there are two, Anisoptera and Zygoptera. The Anisoptera are for the most part much larger and more stoutly built than the Zygoptera, and normally rest with the wings spread out, whereas the Zygoptera fold their wings over the back. The Anisoptera have large eyes set close together, but the Zygoptera have smaller eyes set far apart. Male Anisoptera have only three anal appendages and the penis is jointed, whereas in Zygoptera there are four appendages and the penis is unjointed. The larvae of the two Sub-orders differ greatly, since the Anisopterid larva breathes by means of rectal gills, the anus being closed by an anal pyramid consisting of two pointed cerci and a shorter medio-dorsal process. Zygopterid larvae, on the other hand, breathe through caudal gills, which are three large plates projecting from the end of the abdomen. I have passed round a photograph of part of the caudal gill of a Zygopterid larva, showing the many branched tracheae by means of which respiration is effected. (See Plate I.)

Both suborders possess a very curious form of copulatory apparatus in the male, though it is less developed in the Zygoptera. No satisfactory analogy for this development has been found in any other Arthropoda. I will not attempt to describe it fully, but it is essentially as follows:—The genital pore opens on the ninth segment as might be expected, but the rest of the copulatory apparatus is situated on the segments at the anterior end of the abdomen. The whole sternite of the second segment, and part of the third, form this apparatus, which consists chiefly of a vesicle in which sperms received from the genital aperture are stored, together with a penis through which they are ejected when pairing takes place. The whole apparatus lies in a special groove on the ventral surface of the abdomen and this can be clearly seen even in dry specimens. This peculiar arrangement is responsible for the curious attitude adopted during pairing, when the tip of the



III.

IV.



I.

II.

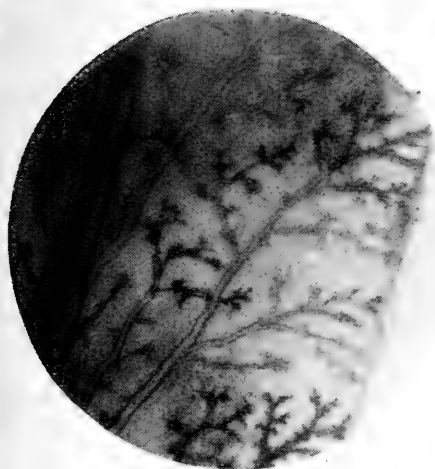
PLATE I.

- I. Mandible of nymph of *Anax imperator*, Leach (a fairly typical Aeshnid nymph), $\times 30$ approx.
- II. Maxillae of the same „
- IV. Labial palpus of same „
- III. Part of Labium of nymph of *Pyrrhosoma nymphula*, Sulz. (a fairly typical Zygopterid nymph).

PLATE II.

- V. Part of caudal lamella of nymph of *Erythromma naia*, Hans. (a Zygopterid) showing the many branched tracheae forming a gill.
- VI. *Anisopterides*: *Aeshnidae*: *Aeshninae*.
Brachytron pratense, Müll. ♂ (above) and ♀: a bred pair with exuviae of the nymphs from which they emerged. $\times \frac{1}{2}$ approx.
- VIII. *Anisopterides*: *Libellulidae*.
(Top) *Corduliinae*. *Somatochlora metallica*, Van der L. ♂, with nymph skin.
(Bottom) *Libellulinae*. *Libellula quadrimaculata*, Linn. ♂ with nymph skin.
- IX. *Zygopterides*. *Calopterygidae*. *Calopteryginae*.
Calopteryx virgo, Linn. ♂ (above) and ♀, with nymph. $\times \frac{1}{2}$ approx.

V.



VI.



VIII.



IX.

abdomen of the female is applied to the ventral side of the second segment of the male's abdomen.

The eggs are, as a rule, rather small, and a large number are laid. All the Zygoptera, and the subfamily *Aeshninae* of the Anisoptera, have well developed ovipositors, which they use to insert the eggs into the leaves or stems of aquatic plants. The usual method is to make a small incision in which a few eggs are laid: the insect then moves a short distance and repeats the process until the leaf or stem contains several such groups of eggs. The *Aeshninae* usually lay more regularly than the Zygoptera. *Agrion* and allied genera sometimes oviposit under the surface of the water, and I have heard of females being found with the abdomen covered with mud. The Anisoptera, apart from the *Aeshninae*, have poorly developed ovipositors and usually lay their eggs at random. Females of *Libellula* and similar genera fly low over the water rhythmically striking the surface with a sharp flicking action of the abdomen. At each flick a mass of eggs is washed off the tip of the abdomen and sinks to the bottom, when the eggs separate as the gelatinous matter surrounding them dissolves. I once caught a female *Libellula depressa*, L. engaged in ovipositing, and the flicking movement of the abdomen was continued for several seconds, during which a fair number of eggs were laid in masses on my hand and in a small tube of water, which I hastened to provide. Unfortunately, I must add that the eggs did not hatch. Another peculiar feature of this Order is the occurrence of what is known as the pronymph stage. There emerges from the egg, not a free larva, but a creature whose legs are folded back and whose mouthparts are often not functional, the whole animal being enclosed in a sheath of chitin and having an appearance suggestive of a small pupa. This is the pronymph. The stage lasts in some species for only a few seconds, in others it may extend to a few minutes, but it is always very short. An interesting case was that of the Zygopteron *Lestes viridis*, Lind., not a British species, though it has been taken in Britain. Oviposition was made on the underside of a willow branch, the pronymph emerging by wriggling the abdomen. Having emerged, it fell on to the bank of the pond near which the tree was growing, and at once began to jump actively about by means of sharp movements of its abdomen, and continued until finally it fell into the water.

The second instar, which emerges from the pronymph, is usually a minute, transparent, long-legged replica of the later stages of larval life. The newly-hatched larva, however, has usually a more primitive breathing system, and the mouth parts are proportionately much weaker than in the full grown nymph. Growth occupies a longish period, varying from one to five years with the species and the conditions under which it lives. There are several ecdyses, and in due course the external wing rudiments appear. Eventually the

nymph becomes sluggish and crawls up a convenient reed stem or other support where the emergence of the imago occurs.

All the Dragonflies are carnivorous throughout their life. Both larvae and imagines have well developed mandibles and maxillae with sharp teeth. I have passed round photographs of the mandible, maxilla, and labial palpus of the nymph of *Anax imperator*, Leach. The labium of the nymph is developed into a long jointed apparatus, which folds back between the legs. The palpi are developed into movable lobes, armed with strong curved hooks and worked by powerful muscles, as is shown in the photographs of Zygopterid labia which I have passed round. The prey is seized by shooting out the labium and grasping it with the palpi; it is then pulled back to the mouth and dealt with by chewing with the mandibles and maxillae, the labium still being used to hold it. I had a large nymph of *Anax imperator*, which disposed of a dozen large tadpoles in this way in rapid succession, taking about four hours over the process. Incidentally the labium is important in assisting identification, as it varies considerably in different species.

There are, however, four very distinct types of nymph associated with different families, which can easily be recognized. The typical Aeshnid nymph is long but not slender, sometimes rather short-legged; the labium is armed with hooked palpi and is flat and circular at the distal end. The habits vary. *Anax imperator*, specimens of which I am exhibiting, is a very fast swimmer and will often pursue active prey such as tadpoles. *Brachytron pratensis*, Müll. and species of the genus *Aeshna* are more sluggish, lying on the bottom in wait for any small living creature to come near. *Cordulegaster annulata*, Latr. lives in a burrow in the mud, out of which it rushes to seize its prey. *Gomphus vulgatissima*, a rare species, has, I am told, similar habits. The nymphs of the *Libellulidae* are of a different type. They are short and stoutly built, often very long-legged, and the labium is very characteristic, the palpi being usually more or less triangular, with saw edges and a sharp hooked point at the distal end; further the distal end of the labium as a whole is very like a miniature ladle, the ventral part being scooped out into a hollow. The nymphs of this family are mostly rather sluggish bottom dwellers, though they can swim well if necessary. *Orthetrum cancellata*, L., however, lives quite deep in the clay mud of old brick pits. I should mention that all these Anisopterid larvae which swim do so by the violent expulsion of the water from the rectum, and some of them attain surprising speeds.

The Zygopterid nymphs also fall into two types. The two species of *Calopteryx* probably represent a rather primitive type, and are very curious insects. They are long and slender in body, and have enormously long legs. They live in fairly rapid streams, strolling about on their legs in a leisurely way, looking as if they were on stilts. The labium of these nymphs is divided down the middle and

very curiously shaped, but unfortunately I have not got a photograph of it. I have no personal acquaintance with the Lestid nymphs, and there seems to be some confusion about the British species. The rest of the Zygoptera, the family *Agrionidae*, are much less grotesque in appearance than the *Calopteryx* nymphs. The caudal appendages are more or less equal in length, whereas in *Calopteryx* the median one is shorter. Further differences between these types are not easy to describe briefly, but I hope will be clear from the specimens exhibited.

The last stage of the metamorphosis, the emergence of the imago, seems to be essentially similar in all the British species. A day or two before it, the nymph seems to feed with even more than normal voracity; then it becomes sluggish and shows an inclination to rest near the surface of the water, finally crawling up the stem of a convenient water-plant and taking up a position where it can get a firm hold on its support. The cuticle then splits across the head around the eyes, and a second split appears at right angles to the first, running back mid-dorsally as far as the attachments of the wings. Through this slit the imago pushes out its thorax by a process of humping the body, and thus withdraws the wings from the nymphal cuticle. Then with a tremendous effort it frees the head and legs. This leaves it exhausted and it hangs out of the cuticle supported only by the abdomen. When the legs have become hardened enough to enable it to grasp the head of the nymphal cuticle it pulls itself up until the abdomen is free. It then clings to the old cuticle during the process of expansion and hardening of the wings and abdomen, after which it flies away, leaving the cast cuticle still clinging to its support. Some of these cast nymphal skins are in my exhibit.

The imago is not fully developed at this stage, being still in what is known as the "teneral" condition. Wings and abdomen are still rather soft and easily injured, and there is an iridescent sheen on the wings, while bright colours have not yet put in an appearance on the abdomen and thorax. The insect often shows a tendency to keep away from its usual haunts near the water during this period. The transition from the teneral condition to full maturity is gradual. In some species it may only take a day or two, but in the *Sympetrini* it seems to occupy weeks. Frequently a teneral male assumes a coloration like a dull form of the mature female. Teneral specimens are useless for the cabinet, as both sexes tend to shrivel up on drying. It is probably during the teneral period that most of the imaginal mortality occurs. The span of imaginal life is usually considerable, extending in the case of some *Anisoptera* to two or three months. Some foreign species are known to hibernate, but one seldom sees a dragonfly later than early October in England, though one has plenty to do collecting nymphs during the winter and early spring.

The Isle of Wight as a Collecting Ground for Lepidoptera.

By S. WAKELY.—Read 24th September, 1936.

The Isle of Wight has been noted for years as a collecting ground for the entomologist, and I am showing to-night a box of Lepidoptera taken in the Island during the last twelve months. A few details of some of the more interesting species may be of interest. The two specimens of *Synanthedon* (*Aegeria*) *fluviventris*, Stdgr. were bred from willow stems cut last August, the moths emerging in July. This species is not uncommon at one or two spots, but as I only got two moths out of a score of stems it is presumably hard to rear. Perhaps they were taken too early, and no doubt February or March would be better months to collect the galled stems.

The specimen of *Calostigia* (*Xanthorhoe*) *olivata*, Schiff. was taken at Ventnor, being tapped out of a hedgerow in the evening. Records of this species for the Island are few. For some years I have known that madder (*Rubia peregrina*, L.) grows in abundance at various localities in the Island, and as *Botys* (*Pyrausta*) *asinalis*, Hb. occurs among this and has been recorded from Ventnor, I decided to search for it. The madder was soon found in quantity growing near the cliff to the west of the town, and by beating this one evening, 17th August, a friend and myself netted five specimens. This locality is given for the species by Stainton in the "Manual," but I do not think it has been recorded here for some years. *Alispa angustella*, Hb. was bred from spindle berries collected the previous August, the moths emerging in May and June. This was of particular interest as an addition to the Island list.

Acalla (*Peronea*) *boscana*, Fb. may be taken commonly in the Island during August in the larval state. This year it was in numbers on the main road at East Cowes near Osborne House. The larva spins two leaves of elm together and feeds in the pocket thus formed, the discoloured leaves being a clue to the whereabouts of the larvae. As the moths have only just emerged, I have shown a few bred last year. Another *Peronea* was found in the larval state in spun leaves of the marsh cinquefoil (*Potentilla comarum*, Nestl.). The locality was Appleford Wilderness—a very wild and little frequented spot near Rookley—and the moths shown proved to be *Acalla* (*Peronea*) *comariana*, Zell., another species hitherto unrecorded for the Island. At the same place were taken imagines of *Choreutis myllerana*, Fb., the larva of which feeds on the local

scull-cap (*Scutellaria galericulata*, L.); and pupae of *Orthotaelia sparganella*, Thnbg., in deformed and eaten shoots of *Sparganium*.

The series of *Stomopteryx anthyllidella*, Hb. were taken in a chalk pit at Upper Ventnor, where they were literally in thousands among the kidney vetch (*Anthyllis vulneraria*, L.). Larvae and pupae were also found among the flower-heads and between joined and folded leaves.

A particularly interesting find was *Evetria purdeyi*, Durnt., among some young pines at Gurnard, near Egypt Point. This species has been previously taken at Freshwater. Meyrick states in his "Handbook": "Kent and Isle of Wight, local; not known elsewhere, but presumably imported. Attached to *Pinus sylvestris*, L., or *P. austriaca*." The young pines, from which I netted the specimens shown, were far too green for *P. sylvestris*, and the needles showed none of the drooping characteristics of *P. austriaca*. It would be interesting to know what species or variety of *Pinus* this really is, the noticeable features being the vivid green of the foliage and the even way the needles stood out in every direction.

The small series of *Cemistoma (Leucoptera) scitella*, Zell., were bred from hawthorn leaves, the larvae making large brown blotches, which are rather disfiguring. It was very common.

While the Island has been collected over pretty thoroughly near the larger towns during the holiday season, I am inclined to think there are plenty of good insects to be turned up, especially off the beaten track and by workers during the late autumn and early spring.

Some Remarks on the Genus *Nepticula*, Z.

By JOSEF KLIMESCH ("Lambillionea," pp. 62-70; 87-96; 116-122. 1935).

Translated by S. N. A. JACOBS.—Read 10th December, 1936.

Published with the consent of the Author and of the Editor of "Lambillionea."

The Genus *Nepticula*, Z., which belongs to the most primitive group of the Lepidoptera, commands our special interest by reason of the monophagy of its larvae and their habit of living within mines; these peculiarities demonstrating the still primitive state of their evolution.

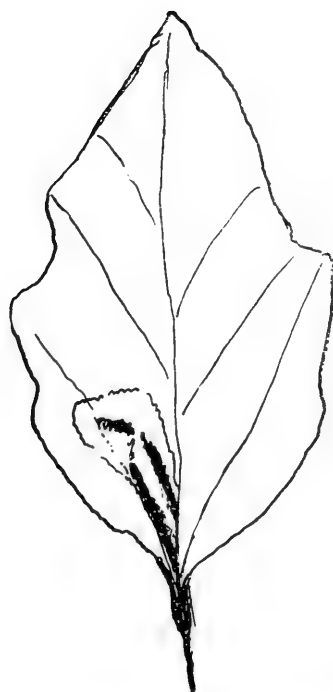
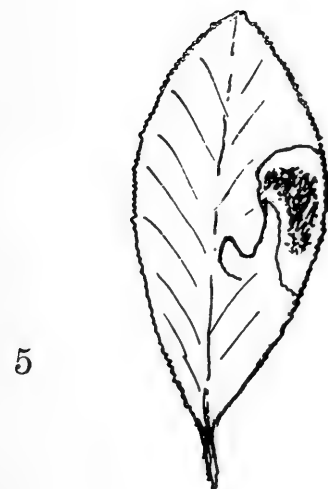
The larvae of the Central European species live, with one single exception, in feeding tunnels within the leaves of plants, the conduits being called mines (Hyponomes); these mines are made in the substance of the parenchyma of the plants, whose epidermis remains intact, thus separating the mine from the open air.

To explain matters, I think it would be as well to mention the various layers composing a leaf:

- (a) A "superior epidermis" devoid of chlorophyll, and often in its turn covered with a special protective layer, the "cuticle";
- (b) below this epidermis there are one or two layers of cells containing chlorophyll, called on account of the arrangement of the cells, the "palisade parenchyma."
- (c) then come cells showing between them fairly large spaces, which is known as the "lacunal parenchyma," and then finally there is
- (d) another layer of cells forming the "inferior epidermis."

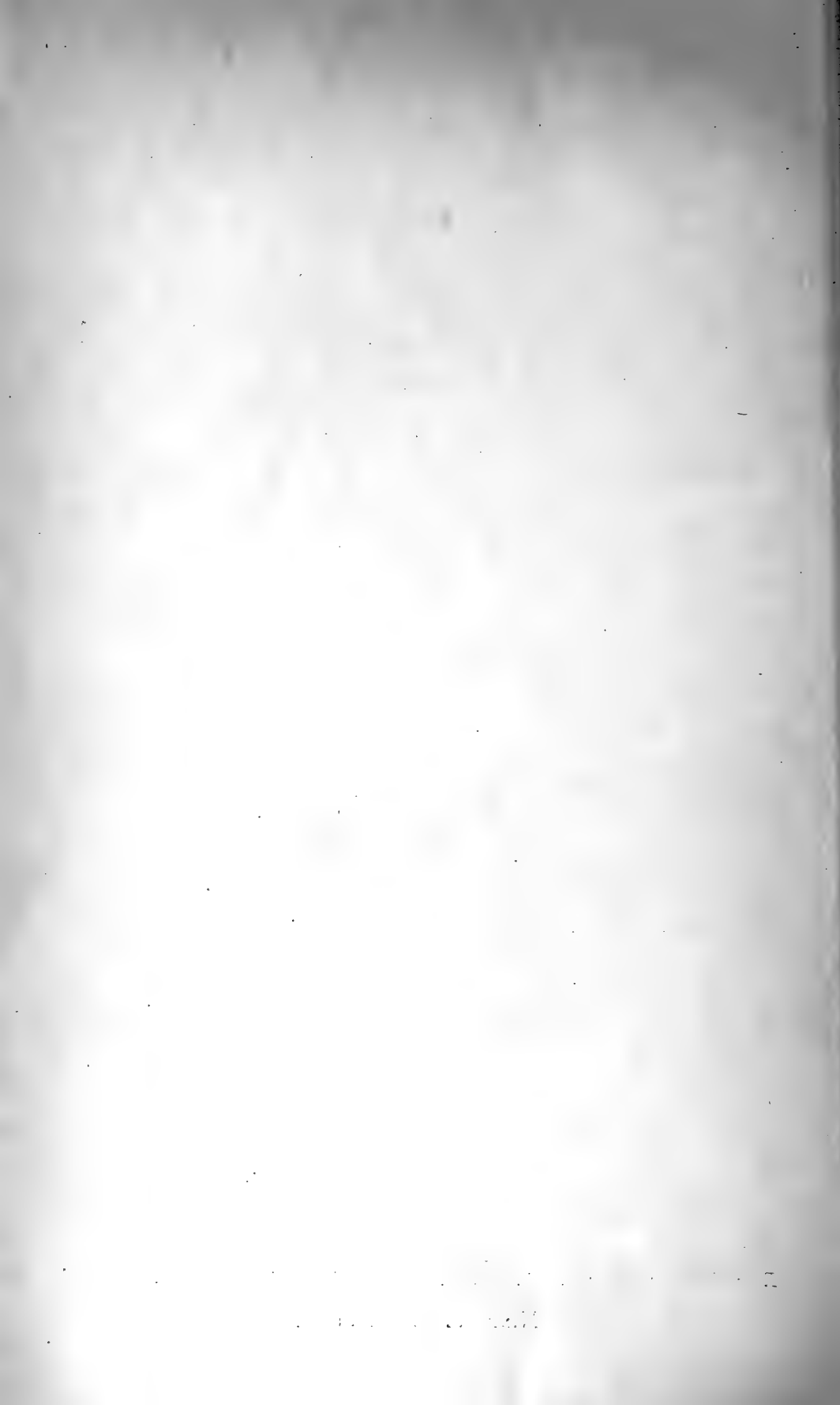
Further, there often exist in leaves bunches of vessels, long tubular structures whose fabric is composed of hard woody cells, (sclerenchyma).

The larvae of the genus *Nepticula* live usually in mines on the upper surface of leaves, and this is because they feed on the chlorophyll-bearing cells of the palisade parenchyma, and seen against the light the mines appear pale green. In the case of mines on the under side of the leaf, a phenomenon which is far from common (*N. trimaculella*, Hw., on *Populus nigra*, L., always mines the under side), the mine is invisible from the upper surface, but with a light coming through the leaf, they show up as before with a paler colour. *N. tiliae*, Frey. most often begins its mine on the under surface of the leaf, and for that reason it is scarcely possible to see it from the upper surface. It is only when, having reached



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MINES OF NEPTICULIDS.



a more advanced stage of growth and changing its ways, it attacks the two layers containing chlorophyll, that the mine, when the palisade parenchyma is eaten, shows clear as glass on both sides. As a general rule the position of the mine in the leaf is constant.

The disposition of the mine, that is the horizontal extent of the mine, is very important in the determination of the species; one distinguishes mines as "Ophionomes," more or less wide mines running round the leaf in a varying direction (Figs. 1 and 2); spiral mines, "Heliconomes," in which the beginning is wound in coils continuing as an ordinary gallery (Fig. 3). Emplacement mines, "Stigmatonomes," extend irregularly in all directions, thus forming a sort of blotch, while some species start with a tunnel mine developing later into a blotch and these are known as "Ophistigmatonomes" (Fig. 5), (*N. rubivora*, Wck. and *N. plagicolella*, Stt.).

The egg is deposited, sometimes on the upper, sometimes on the lower surface of the leaf. Under a low power magnification the egg may be seen as a dark shining spot, indicating the commencement of a mine. The eggs which I have examined are hemispherical in shape, with a smooth shell without marking. They seem to be attached very strongly by the female to the epidermis of the leaf, so that even on old mines, the empty eggshell is still to be found attached to the leaf. At the time of hatching, the larva leaves the egg at the point of contact with the leaf, and penetrates immediately into the leaf; the shell of the egg is not eaten and makes an effective seal to the entrance to the mine.

The development of the feeding mine is important in the determination of the species; some of them follow the margin of the leaf, some run along the principal nervures of the leaf, which they eventually cross to continue the mine in a similar manner along the next parallel nervure. Many start with a tunnel mine only to feed later in a blotch. In the case of some species it is the habit, especially during the first days, to keep the space resulting from the taking of food restricted to as narrow a space as possible. In such mines as are restricted to the area between two nervures in the leaf, the turns are very close, so that often one turn is on top of the following one, that is, the mine is formed to fold like an intestine (Fig. 4). It is always to be noticed that the young larva avoids as much as possible crossing the larger nervures of the leaf, only the adult larva, whose jaws are better developed, can cross such obstacles as these nervures made up of bunches of vessels composed of the cells of the sclerenchyma. One sometimes meets, especially in species peculiar to poplar and sallow, larvae which start mining at the beginning of the chief nervure of the petiole; these are the larvae of *N. hamnoverella*, Glitz. (*Populus nigra*); *N. turbidella*, Zell. (*P. alba*, L.), and *N. intimella*, Zell. (*Salix capraea*, L.). In this case the larvae live at first on the parenchyma filling the petiole and nervures, and then on the palisade parenchyma of the leaf, which constitutes a richer diet.

The length and width of the mine depend both on the species under consideration and also on the consistency of the food matter. In the case of the thicker leaves, of course bearing in mind the species under consideration, conduit mines are considerably shorter than those in thinner leaves, in fact, in this latter case it is obvious that the larva will have to traverse a longer road in order to be able to take the same amount of food as its relative mining in a thicker leaf.

Not only are the shape and development of the mine of great importance in determining the species, but also the way in which the frass is disposed of must be considered. In the case of *N. sub-bimaculella*, Haw., which mines the leaves of oak, in the first place as a tenuous conduit, and then as a blotch, it is stated that a partial evacuation of the frass accumulated on one side of the blotch is effected by a curved cut made in the under surface of the mine. In all other species the frass remains in the mine; in the case of the conduit mines, it is left in a line, whose width differs with the species, sometimes filling the whole mine, in all species down the centre, with the exception of those species previously mentioned which mine in the petiole of *Populus* and *Salix*, which deposit the frass in two rows as soon as the mine has left the petiole and entered the leaf. The frass is never left in two lines of fine points along the two sides of the mine, leaving the middle free; in such case it is a dipterous mine.

The manner of disposing of the frass is, in almost all species, constant throughout the mine; some, for example *N. tiliae*, Frey., vary, forming sometimes a thin line, and sometimes entirely filling the mine, these two methods of procedure have been found together in this species, a fact which brought Dr. Hering of Berlin to suppose that we were really dealing with two distinct species.

The relatively short duration of the mining period is explained by the fact that the larvae find in the interior of the leaves a more nourishing food than those feeding in the open, which latter have to take, in addition to the interior of the leaf, a considerable quantity of hard tissues which are of no use to them for body development, as for example the bundles of woody cells; on the other hand, a life passed in a space closed in on all sides, such as a mine, can produce raised temperatures which tend to more rapid growth. It is, however, to be noted that the larvae of *Nepticula*, which are in other respects very delicate and sensitive, can stand temperatures down to -4° C. without suffering any harm, as I have been able to observe on several occasions in the case of *N. ruficapitella*, Haw., which mines, late in October, in the leaves of the oak.

Generally speaking, the larval period of the first generation which mines at the beginning of summer (end May to July) is shorter than that of their congeners living at the end of the summer, which is easy to understand for the larvae feeding between May and July

find the vegetable tissues more delicate than in the period August to October; the hardening of the veins of the leaves is also more advanced. The species mining in the leaves have a shorter period of life than those mining in the petioles of *Populus* and of *Salix*. In the latter case I have observed life periods of three or four weeks; the larvae in summer mines live about five to fourteen days, and it is said that an even shorter period has been observed.

The body colour of *Nepticula* larvae is often a very important matter in the determination of species, as also is the colour of the chitinous portions such as the head and plates. The usual colours are pale, but one finds also a magnificent honey yellow, and emerald green. The ordinary elements of an external design, as are usual in the external feeding larvae, are absent, but the nervous system is always to be seen more or less clearly, usually in a darker green.

When the larvae of *Nepticula* are examined by the aid of a microscope, we are immediately struck by the principal characteristics which distinguish them from those feeding in the open; flattening of the body, almost entire disappearance of the legs, strong development of the projection of the segments, and horizontal position of the head. It is evident that owing to the completely different manner of life in a mine, the shape of the body and the method of eating have to be quite different from those of other larvae. In the mine the larva can only move forward in a horizontal position, following the same direction for feeding.

At the time of pupation, the larva leaves the mine by way of the upper side of the leaf by means of a semi-circular cut in the epidermis, and drops on a thread to the ground, where it sets about spinning its cocoon under the leaves or amongst the particles of earth. I have never noted any discoloration of the larva prior to pupation as is frequently the case with larvae feeding in the open. Amongst our Central European species there are only three which pupate in the mine; *N. weaveri*, Stt., on *Vaccinium vitis-idaea*, L., *N. septembrella*, Stt., on *Hypericum* spp., and *N. agrimoniae*, Fry., on *Agrimonia eupatorium*, L. In the case of *N. weaveri*, the larva takes care to prepare in advance a means of exit against the time when it is ready to turn into a moth, and to this end it makes in the mine (a blotch mine) a tube leading to a spot where it will then be able to leave the leaf, instinct dictating this precaution against the dessication of the leaf and its consequent shrinking, which would otherwise bar the egress to a moth, born without means for forcing itself through the hard layers to liberty.

The cocoon of the pupa varies in form with the different species, but still more in the matter of colour, so that it can equally well take its place along with the characters of the mine and the larva in the determination of the species. The cocoons of those species which pupate principally in the ground (*N. atricollis*, Stt., *N. angulifasciella*, Stt., *N. rubivora*, Wck. and *N. arcuatella*, H.-S.) are

greenish black to black. Other colours met with are white and yellowish, but the dominating colour is brown in various shades from pale to dark. The texture of the cocoon also differs with the species; some are smooth (*N. marginicolella*, Stt.), others rough (*N. floslactella*, Haw.), and in the case of this latter it is easy to note the threads of the wrapping, and one can follow them very easily in the case of *N. sericopeza*, Zell., whose cocoons may readily be found on the bark of the food plant (*Acer pseudoplatanus*, L.), a rare exception in the case of *Nepticula*, which, as has already been stated, usually make their cocoons on or just in the ground.

Most often the cocoons are a little arched, becoming flat, and are from circular to oval usually with a flattened margin. At the larger end of the cocoon is found a large horizontal slit out of which at the moment of hatching, the pupa forces itself to quite half its length.

The pupae are very delicate with thin skin, and somewhat flattened. The sheaths of the legs are joined together very loosely so that the different parts of the body of the complete insect may be easily seen. On the back of the pupa are brushes placed in rows which serve to push the pupa half out of the cocoon on the emergence of the imago.

Emergence most often takes place during the morning or the early afternoon, more rarely in the evening; the method varies with the species.

In nature one can observe these little moths most easily towards evening, when they appear to set about their reproductive mission, walking about rapidly on the leaves of their food plants, or on the trunks of trees; at least it is thus that I have on many occasions taken paired specimens of many species.

The larvae of *Nepticula* are frequently attacked by hymenopterous parasites, and owing to their transparency, it is easy to recognise the parasitised individuals, by the presence of a foreign body, a little darker, in the neighbourhood of the vessels.

Ordinarily parasitised larvae prepare a cocoon, continuing to observe the dictates of their instinct, but in the case of species which leave the mine for pupation, the cocoon is sometimes made in the mine.

Birds, probably tits, seem to be classed among the enemies of *Nepticula* larvae, and this assertion is based on having often found mines despoiled of their occupant and exhibiting a hole. Sometimes one finds dead and colourless larvae, which have been emptied, and in this case it is possible to see on the leaf where the larva is found a little shining spot. At this place is a little red spider (*Allotrombium* sp.), which has sucked the larva. It has sucked the viscous matter from the body, some of which has dried on the leaf leaving its mark.

The determination of *Nepticula* imagines taken in the field presents in most cases, serious difficulties. Very few species exhibit

macroscopic features which are sufficiently characteristic to permit of determination on these alone. With a number of them, the colour of the hairs on the head, and of the scales of the collar form a good criterion for distinction, but these are characteristics which are very easily lost owing to the well-known liveliness of these little moths, and the result is that the species in question cannot be recognised by a macroscopic examination with any degree of accuracy.

Breeding gives entirely different results ; as I have shown in the former part of this study the larvae form in the leaves constant and very characteristic mines and thanks to the disposition of these mines, to the colour of the larva and to the knowledge of its food plant, one can almost immediately in all cases determine the species. This is why the various broods (I will give ample instructions on the subject of breeding) should be marked in some distinctive manner (numbering is strongly recommended) repeating this with the mine and the imago. On the other hand a notebook should be kept, under the same distinguishing marks, mentioning the food plant, the day and place where the mine was found, the colour of the larva and of its head, notes of all of which data should be carefully taken.

The rearing of Nepticulids is far from presenting the difficulties which one would imagine by reason of their smallness ; the fact that the larvae in the course of their larval existence do not leave the leaf which they mine, so that this leaf suffices for their feeding needs, dispenses with one of the greatest cares of breeding larvae which feed in the open, which often takes a considerable time. The difficulty in the beginning is to find the correct degree of humidity required during the mining period of the larvae as well as during the period of repose in the cocoon ; it is a matter of keeping the leaf in a state of freshness up to the moment when the larva, having reached its full size, leaves the leaf, and this end is gained by utilising small closed glass receptacles whose bottom is covered with slightly damp earth. It is then indispensable that an adequate supply of moisture be maintained in these vessels for wintering the cocoons, in which the larvae often do not pupate until after hibernation ; it must not be forgotten that these tiny creatures will perish quickly in a dry place, and that nature provides them, often at the end of the winter, with much humidity. The amount of moisture necessary varies with the species, a matter that I will take up again later.

Where and when should one seek mines with reasonable hopes of success ? The best places are on the edges of forests where there are numerous bushes and small trees ; some species prefer the shady and somewhat damp places (such as *N. arcuatella*, H.-S., on *Fragaria*, and often *N. rubivora*, Wck. on *Rubus caesius*, L.). The beginner should commence his search on bushes, where the mines are more easily discovered and their quest there is less fatiguing than among

the low plants. He will find almost at once empty mines whose conduits, filled with frass, have become darker by reason of their age; soon, however, he will succeed in distinguishing occupied mines from the old ones. It must be pointed out, however, that some species are very difficult to find, such as the mines of *N. basiguttella*, Hein., on oak, and those of *N. aceris*, Frey. on *Acer campestris*, L. and *A. platanoides*, L., and the reason for this is that the colour of the droppings, filling the whole of the mine, is almost the same as that of the green of the leaf surrounding it; here the pale green larva when mature, shows up more clearly than the line of fresh frass.

It is on leafy trees that it is easiest to discover the various mines in which the line of frass is to be noticed in a dark line, ranging from brown to black, down in the middle of the mine or else filling it completely. In the same way, the blotch mines (*N. plagicolella*, Stt. on *Prunus spinosa*, L., *N. argentipedella*, Zell., on *Betula*, *N. atricollis*, Stt., on *Pyrus malus*, L.) are usually easily distinguishable by reason of their size. It is recommended, that in order to find occupied mines as easily as possible when seeking the more delicate species and mines that are not apparent in full daylight, the searcher lie on his back under the bushes. In this way one may successfully obtain mines, for example, of *N. tiliae*, Frey., which, being commenced on the under side of the leaf, do not strike the eye when examining the upper side of the leaf.

With some species the mining of the larvae produces a partial discoloration of the leaves which should strike the attention of the novice; there are, moreover, mines of certain species which one must seek towards the end of the autumn in the leaves of *Populus* and *Salix* (*N. argyropeza*, Zell., *N. turbidella*, Zell., *N. intimella*, Zell.); with these the mined places strike the eye at a distance by reason of their green colour in the middle of a leaf turned yellow or red by reason of the influence of autumn.

A close inspection shows that the mine passes from the petiole into the leaf; it is established that in the species named above the female deposits her eggs on the petiole. The manner in which the frass is disposed of is interesting; deposition takes place at the sides in two lines so that there remains a clear space in the middle (Fig. 6) and it is by way of this space that the larva withdraws into the petiole where it hides during the day in the young stage. This is why these mines seem to be all unoccupied, but in the evening the larva is found feeding in the leaf. However, this only appears to be the case when leaves are attached to the branch; I have found, at any rate in fallen leaves, adult larvae mining during the day and I have been able to observe that they do not retire into the petiole; this is why they do not, towards the end of their labours, make a double line of frass, but leave the droppings irregularly spread over the middle of the mine.

The phenomenon where the part of the leaf occupied by the larva remains green finds a plausible explanation in notes furnished by the Swedish observer, Trägårdh. He gives it as his opinion that the larva occupies in the petiole a portion of the canals which serve to circulate the vital substances of the plant (hydrate of carbon, etc.), the result being that these substances remain in the leaf, and the chlorophyll necessary to feed the larva is maintained.

Some larvae mining in the summer and autumn produce less striking modifications in the colour of the leaves; I will quote *N. prunetorum*, Stt., on various species of *Prunus*, and *N. acetosae*, Stt., on *Rumex*. The part surrounding the spirals made by these larvae in their early stage is reddish and it is that which makes them easily visible. Similarly for *N. marginicolella*, Stt., on *Ulmus suberosa*, Ehrh., I have observed a yellowish discoloration where the mine commenced. These yellow spots show up before the beginning of the mine appears; this I have been able to prove on leaves put by for observation in which after a time mines have developed. The beginning of the mine shows superficially as a black spot; it is, in point of fact, formed by several close turns of the mine filled with dark frass. A close examination will show that it certainly is so in *N. marginicolella*, Stt., but anyhow the yellow spots which I have noticed on the leaves of *Ulmus suberosa* are a good indication for seeking mines.

A feeble reddish discoloration may also call attention to the beginning of the round mine of *N. rubivora*, Wck., on *Rubus caesius*, L., and the same applies to the autumnal mines of *N. myrtillella*, Stt., on *Vaccinium myrtillus*, L.

The mines of the species feeding on low plants are in general more difficult to discover than those on bushes and trees. In the first place this difficulty arises from the low position one must adopt for this quest, and in the second place the larvae mining these plants very often show a preference for the lower leaves close to the ground and covered by the upper leaves. Certain species prefer the upper leaves in the better light, often fully exposed to the burning rays of the sun (*N. helianthemella*, H.-S., *N. thuringiaca*, Mart., *N. fruticosella*, Müll-Rtz.). However, in general the mining larvae prefer shade, and this is especially the case with *N. gei*, Wck., on *Geum urbanum*, L., which is best sought for in damp woods. Also *N. serella*, Stt., and *N. occultella*, Hein., on *Potentilla tormentilla*, Sibth., which like places in woods covered with moss, and *N. bollii*, Frey., on *Rubus fruticosus*, L. should be sought in the deep shade of the wood.

The majority of Nepticulids are double-brooded and the larvae should be sought from the end of May until July, and again from the end of July until October; however, this question of generations is far from being settled in the case of all species. Some of them (notably, and in the first place, those living on *Sorbus aucuparia*,

Guertn. : *N. nylandriella*, Tngstr., *N. sorbi*, Stt., *N. aucuparia*, Frey.), have, contrary to older assertions, only one generation, in June and July ; in others one finds larvae in August giving imagines during the month of September (*N. freyella*, Heyd., *N. gei*, Weck., *N. tiliae*, Frey., *N. marginicolella*, Stt.). Perhaps here it is a question of a third generation, but it is a difficult matter to judge in any satisfactory manner ; in fact in the case of most of the species one can find occupied mines and imagines from July until September.

The species previously mentioned, which mine at the end of the autumn in the petioles and then in the leaves of diverse species of *Populus* and *Salix*, have, without doubt, only one generation, and it is the same with species living on mountains and high places such as *N. dryadella*, Hofm. on *Dryas octopetala*, L.

In almost all cases the pupae or mature larvae hibernate in their cocoons ; there are, however, two cases where the larva hibernates in the mine, only commencing to mine properly in the spring ; *N. bollii*, Frey. on *Rubus fruticosus*, L., and *N. pretiosa*, Hein. on *Gemm rivale*, L. It is probable that *N. weaveri*, Stt. hibernates in the egg, for one finds the young mines from the end of April until the beginning of May. The biology of *N. sericopeza*, Zett., is not yet known ; the larva mines in the autumn in the wings of the seed vessels of *Acer pseudoplatanus*, L. ; it hibernates in the larval form. In the spring when the buds of the food plant open, the larva climbs towards the top of the tree and makes remarkable cocoons from pink to brown in colour, rounded in form, and placed in cracks and fissures.

It must be kept in mind that it is difficult to indicate any special time for seeking occupied mines with any certainty of success ; the time of life of the larvae, which develop very quickly, depends very much more than in the case of other lepidoptera on climatic conditions, together with which must be considered local conditions (altitude, etc.), which also play their part. I would consequently advise those who have not acquired practical experience to limit themselves for a start to visiting the same ground as often as possible at short intervals, having in view the securing of rare species. The reason is that often in less than a week the larvae of one generation can have completed their evolution and there only remain empty mines. Notwithstanding the most careful notes and observations of mines, both empty and full, there will be surprises in store in the course of years.

The preferable method to follow for the beginner, the best way to become familiar with the ways of the Nepticulids, is then to breed them, commencing by collecting living larvae in the autumn (September and October). It is in fact at this time, when other lepidopterous duties are coming to their end, when one can best find the necessary time to give undivided attention to this most interesting subject of *Nepticula* mines. The number of mines to be found

is also much greater in autumn than in spring, the time for those of the first generation.

The best way for transporting the collected mines is in airtight tin boxes, and one should take special care to keep the various plants separate. On returning home, the collector should carefully examine the mines if he has not already done so while out collecting, and separate them according to species; if it so happen that in species appearing identical there nevertheless seems to be a difference, no matter how slight, in the form of the mines, he should take care to treat them separately and make a special note of the differences in the notebook which I have previously recommended.

For breeding I make use of flat-bottomed glass tubes usually 40×80 or 40×100 mm., but certain species (*N. argyropeza*, Zell., *N. turbidella*, Zell., etc.) allow the use of a larger vessel, such as an ordinary jam jar. However, I do not make use of such vessels in the ordinary way because firstly of the difficulty experienced in regulating the moisture, and secondly the difficulty in observing the progress of the brood, more especially when it is a matter of a species with which I am not thoroughly familiar. It is permissible to use the larger jars when it is a matter of large broods of common species, although I discourage mass breeding; it is in fact an almost certain source of mould, because the larvae are in different stages of growth. In seeking a suitable place for pupation the larvae seem to be inclined to spin up where there is mould, and according to my observations they always perish when they do this.

The bottom of the small glass vessel is covered with a bed of slightly damp earth, about one or two centimetres deep is a convenient quantity, and frequently on this I place well-cleaned and finely-chopped moss. The choice of the earth is very important and when I have neglected this point I have had some sad experiences. One must in no case make use of hard clayey soil as the moisture transforms it into a solid block. The larvae of the species that for the most part pupate on or in the soil, prefer a soil composed of loose particles which the moisture does not unite; it is in fact between these particles that many species make their cocoons.

The mines, segregated according to species, are cut from the leaf with a pair of scissors in such a way that the larvae will still have some uneaten leaf to ensure a food supply. With a little experience one will easily be able to judge how much to leave, bearing in mind the state of development of the larva in question. That done, one places them vertically in the slightly damp soil in the vessel, the upper surface of the leaf being placed outwards, and the number of ten mines is a figure which should not be exceeded. The vessel is then closed by a tight-fitting cork and placed in a quiet place not too much exposed to the light. This last recommendation is of importance, for if the light is too strong it causes a condensation around the bottom part of the vessel, which will prove a danger to

the larvae which have left the mines and are wandering over the earth and inside of the glass in search of a place for pupation, and can easily drown themselves or at least stick to the glass. Some species seem to be sensitive to too strong light at the time for pupation. It was for this reason that in the beginning I was never able to get pupae of *N. arcuatella*, H.-S.; after abandoning the mine the larvae wandered aimlessly about the vessel and eventually died. Since I have placed the broods of *arcuatella*, the larvae being fully grown, in deep shade, they pupate as well as I could wish, and it is the same in the case of other larvae of the groups with black heads and black cocoons (*N. angulifasciella*, Stt., *N. atricollis*, Stt., *N. rubivora*, Wck.) which enter a little way into the soil.

It stands to reason that the corks should be removed from time to time (it is best to do so daily) for a short time to ensure ventilation. In most cases the collected larvae will have completed their development after a stay of four or five days at the most, and during this time the leaf will easily remain fresh in the glass vessels whose use I have advised. In larger vessels the leaves being farther from the damp soil begin to wither after a very short time, and it is for this reason that I advise the use of the smaller vessels.

For the construction of their cocoons the various species choose different situations in the glass vessel in which they are raised. The majority pupate on the surface of the earth between the particles. The species which seek as smooth and dry a place as possible for pupation are more difficult; they wander such a long time about the inside of the glass that they sometimes fix their cocoon half to the cork and half to the glass and at other times they spin up in the little cracks or holes in the cork if they fail to pupate in the angle between two raised nervures of the leaf (*N. ulmifoliae*, *N. ulmicola*, *N. ulmivora*, Hein., *N. marginicolella*, Stt.). One must not, however, suppose that in nature the cocoons are placed thus on growing leaves; it must be borne in mind that conditions in captivity are very different. In the batches where many pieces of leaf containing larvae are placed side by side certain species (*N. aceris*, Frey., *N. floslactella*, Haw., *N. microtheriella*, Wing.) form their cocoon between these leaves. Others again prefer the inner surface of the glass (*N. anomalella*, Göze.). This last species has also the fatal habit of placing its cocoons one on another so that it is not uncommon to come across five or six thus united, with the result that there are always some imagines which have not room to develop and thus die.

When all the mines have been abandoned, after having taken full notes about them, the leaves may be dried and placed in a sort of herbarium (a herbarium of mines). By removing them immediately the pieces of leaf containing the mines are still fresh and it is thus easy to distinguish and recognise the characteristic details of the species in question. This keeping of the mines resulting from

breeding is most interesting and is of great service in identifying the resultant imagines.

The larvae collected in autumn will in almost all cases only produce moths the following spring, so that it is most necessary to hibernate the vessels containing the cocoons. The glass vessels are left open and are placed in a spot exposed to the winter cold such as in an open shed or in a summer house. During the winter it is necessary to damp the earth at the bottom according to whether the surrounding air is warmer or damper; this is done with the aid of a pipette. This practice should be increased towards the end of the winter, especially for the species whose habit it is to emerge in May-June (*N. atricollis*, Stt., *N. arcuatella*, H.-S., *N. rubivora*, Wck., *N. angulifasciella*, Stt.). On visiting the broods one will, alas, find that here and there the cocoons have been attacked by a thick, chalky, powdery mould. When the cocoons so attacked are affixed to the inside of the glass one can see white radiating lines similar to the frost flowers one sees on windows in winter, and they can thus become a danger to the neighbouring cocoons; I have noted this phenomenon equally whether the broods have been kept dry or damp. This chalky mould has no connection with the mould that forms on elm leaves, which according to my experience has no deleterious effect on the neighbouring cocoons. This chalky mould has its origin in dead larvae and pupae from which the mycelium arises and spreads in all directions, so it is obviously necessary to remove these cocoons and destroy them at once.

Some entomologists make a point of forcing their broods, that is to say hastening the development of the insects by placing them before their time in a heated place. I would, however, discourage this practice in the majority of cases, for it is my experience that only a few species will permit of such treatment without danger. Among these I will mention *N. fragariella*, Hein., and *N. gei*, Wck. One may add *N. plagicolella*, Stt., *N. floslactella*, Haw., *N. prunetorum*, Stt., *N. splendidissimella*, H.-S., *N. aurella*, Fb., *N. argenti-pedella*, Zell., and *N. lonicerae*, Frey. The aforementioned species of the *N. angulifasciella-rubivora* group, react very badly to being placed in a heated room at once. The best way is to leave them until April, keeping the surrounding temperature as natural as possible, and one will then have the pleasure of seeing the moths emerging from May until the beginning of June. Among the species mentioned the last named are usually considered difficult, but it is my opinion that this is only on account of the fact that too little notice is taken of their peculiarities.

One can, in March, place the majority of *Nepticula* broods in a warm room. The tubes, which have remained open through the winter, should now be closed to prevent the escape of the moths on their hatching. This closing may be effected in two ways; when the tops of the glass vessels are ground, small squares of glass can

be used; otherwise one can use tissue paper held in place by a rubber band. In a heated room it is necessary to renew the moisture fairly often; each time two or three drops of water introduced with the aid of a pipette should suffice. After five to eight days, *N. fragariella* and *N. gei* will already start to appear, but more time is necessary for the other species, say from three to six weeks. One should inspect the vessels as often as possible as the imagines are exceedingly active and soon rub off their scales. This is another reason for my discouraging the raising of large numbers in one vessel; one not only gets rubbed insects, but they are also very difficult to capture when there are several of them in the breeding vessel. In order to avoid exciting the insects the breeding vessels must be kept from the light, and I give this advice especially to those who have only a short time during the day for supervising the breeding and capturing the insects and setting them.

In capturing the insects for killing this should be done close to a small closed window, for an insect trying to escape will always fly towards the light of day, which means towards the window glass, where they may easily be forced into the killing bottle by means of an adroit puff.

For killing the imagines, I make use of a test tube 95×20 mm., which I arrange as follows; in the tight-fitting cork I make a hole in which I place a wad of cotton-wool, which is moistened with a drop of acetic ether for preference, but one must be careful not to put too much as the superfluous ether can easily wet the cork and inside of the tube, thus causing the insects to stick. To prevent the fogging of the glass I use several layers of white blotting paper, well rammed down, in the bottom of the tube, which also absorbs the meconium evacuated in the death agonies. I only leave the insects in the bottle long enough to stupefy them, say about thirty seconds; if the insect remains too long in the bottle, the wings fold over the back and the benumbed legs stretch out in front and in this position it is almost impossible to pin and set the specimens.

For pinning the insects, I use a block of soft peat about 6×9 cm. covered with soft horse hide, the rough side outwards; this is preferable to the pads of felt usually used. The stupefied moths have their wings invariably placed in a roof-like position over the back, which is the usual resting position. They are pinned with the pins known as "minuties," the point being previously dipped in a clear solution of nicotine (chemically pure). This pinning is a most delicate operation and calls for the greatest care, for a badly pinned insect may prove an absolute failure in setting. I advise the student not to strain his eyes, and to make use of a low-power magnifying glass (2 or 3 diameters) which will give the best results.

Above all others I prefer the stainless minuties made by Krupp; they are very stiff and have a good point although they are possibly

a little too large for the smallest species (*N. nylandriella*, Tengstr., and *N. microtheriella*, Wing.,) for which species I use the black enamelled minuties known as "ideals." At the time of buying one should make sure that the enamelling and points are both of the finest quality, as it frequently happens that they remain rough and the points are not strong, so that the point bends when placed in the groove of the setting board. Prudence is always advisable.

I take the pin in the fingers and pierce the insect through the thorax in the usual manner, but care must be taken that it is directed correctly, as to place the pin a second time is an exceedingly difficult matter and probably means the loss of the specimen.

I have completely given up the use of Potassium Cyanide for killing the moths, for while only a feeble stupefaction is obtained this is coupled with a rigour which is most unfavourable for good setting. I make a point of setting the insects on the spot; later on they are never so supple; it is only when stupefied that they respond to the slightest puff. One need not fear the insects coming to life on the setting-board, the poisoned pin kills the most slightly stupefied insects.

The insect thus pinned is seized with pointed forceps and placed on the setting-board. For Nepticulids I use only short setting-boards four or five centimetres long with a groove from three-quarters to one and half millimetres wide. The setting is done more readily than on the thirty centimetre boards usually used. These little boards, on which one can set two or three insects, are fixed in a groove in a board about 17×18 centimetres, so that while setting the hand in use is comfortably placed, a great advantage in performing this task. The groove should have sharp edges so that the bases of the wings should be supported and should not be concave.

For braces I use ordinary tissue paper, which, on account of its suppleness, is preferable to the parchment paper usually used, which has the fault of very often damaging the long fringes of the wings. This brace should be as narrow as possible and should be placed right at the base of the wings, and kept in position by a fine but stiff pin. The wings are put in suitable position by means of a No. 000 pin acting on the lower side of the wings, the point of the pin thus never comes in contact with the surface of the wing. For covering I also use tissue paper, and by using this method the insects show no trace of being handled when they are removed from the board, which can be done after five or six days, and they are of superior quality in all respects.

The setting-boards (it is as well to have at least ten of each size) are shut up in a wooden box whose bottom is strewn with naphthaline. In taking the insects from the board, the pointed forceps above mentioned will be best. As for the insects which, owing to their smallness, cannot be put directly into the collection, they can be

mounted on blocks of *Polyporus betulinus*, which is perfectly white; as an alternative one can use sunflower pith, but this is not to be recommended as sunflower pith is hygroscopic and easily rusts steel pins, and further the blocks are so porous as to work loose on the pins that should be supporting them.

Owing to the fact that the cocoons, as already mentioned, often constitute a means for distinction between species, they are usually placed on the blocks with the insects, and from an aesthetic point of view, it is necessary that the pith blocks should be cut as narrow and as small as possible so that the insects stand out better.

Here we have the insect duly mounted and it now only remains to label it with the index figure of the brood from which it came and the data label, mentioning on the upper surface the date and locality, and on the under surface the food plant and the name of the species; thus prepared, it only remains to put it in the collection.

An indispensable part of a collection of Nepticulids is the herbarium of mines which I have already mentioned, in this way all the mines from which imagines have been reared may be preserved as also those mines found empty, for of these one can in the majority of cases determine the species which has made them. It is also important to state in the case of the empty mines the locality of collection and the date. I also advise mentioning whether the mines found were all empty or whether the empty mines were taken in company with occupied mines, which information will be of great service in subsequent search for the species in question.

Unfortunately there is no complete work on the Nepticulids. The literature published in recent years is dispersed amongst the various entomological papers. Professor Hering, Curator of the Natural History Museum of Berlin, the authority on mines, has furnished the greater part of modern literature concerning lepidopterous miners, by means of a number of important works and synoptical essays. I specially advise beginners to read "*Oekologie blatt-minierender Insektenlarven*" published by Dr. Hering (Gebrüder Borntraeger's edition, Berlin, 1926); it is this work which contains the various indications contained in the first part of this present study.

I must also mention amongst the best works those of *Petersen* ("*Stett. Ent. Ztschr.*," 1930), of *Müller Rutz* ("*Plusieurs contributions faunistiques à la faune de Suisse*"), of *Schutze* ("*Les papillons du genre *Nepticula*, Z.*" Bautzen, 1900), of *Toll* ("*Kilka slow o krajowych gatunkach rodzaju *Nepticula*, Zell.*" Lwow 1932), as well as the papers of *H. Skala* in the various entomological papers on the *Nepticula* species of Upper Austria. In France the late *Abbé J. de Joannis* and *M. S. le Marchand* have also produced some serious contributions to the study of these little moths.

The beginner should not be discouraged by the fact that the reference literature is very widely dispersed, and in part, difficult to

get, for almost every museum will have the most important and best-known works on the Microlepidoptera. He can make his own notes, both biological and diagnostic.

The beginner should get in touch as soon as possible with the specialists, of which the number is very limited at present; the exchange of ideas with experimental collectors is of great value as it allows the beginner to keep up with new biological discoveries which are unfortunately not published, and can thus be put on their guard against certain errors which cannot otherwise be avoided. It is interesting to keep all personal observations and letters from other amateurs, filing them according to species and thus making a reference library.

There should still be much to add to the field of activity open to the collectors of *Nepticula*. The novice will realise rapidly, after having overcome the initial difficulties, how great are the possibilities for spreading his activities over such interesting ground; much remains to be discovered both biologically and systematically. In comparison with those who are attached to the Macro-Lepidoptera those who study the *Nepticulina* are very few, but how great will be their value when, thanks to new co-operation, they are able to collaborate with others interested.

If this little work inspires some new specialists, it is with this wish that I finish, hoping that I have been able to interest the entomologists who have done me the honour of reading my paper.

[For *N. weaweri* read *N. weaveri*, Stt.]

Fossil Insects.

By J. A. DOWNES, B.Sc., F.R.E.S.—*Read 14th January, 1937.*

Fossil insects, when compared with most other kinds of fossils, are really very rare, and when found, are usually incomplete. This is due largely to the nature of chitin, which although very resistant in some ways, usually perishes slowly through the long continued action of water during the process of fossilization. It survives only in fine-grained sediments which give rise to the rocks we know as clays and shales, and in certain limestones. The wings are usually much more resistant than other parts, and, except under very favourable conditions, they are the only parts that remain and even they are frequently very fragmentary. These facts have led to the study of wings, and in particular of wing variation, becoming very important in working out the evolution of insects. Fortunately wing venation seems to be, on the whole, a very good guide to the relationships of insects, since it has not apparently varied so rapidly that features common to two related groups have been quickly lost.

The oldest known fossils that are certainly insects are in the upper part of the Carboniferous system. These strata, in this part of the world at least, are usually composed of bands of coal alternating with bands of sandstone or shale. In some of these shales, which are thought to have been formed of silt deposited in the large lakes of the coal-forests, insect wings, and in some cases, more complete insect remains, have been found. The most famous insect bearing bed of this type occurs at Commeny in France, but others are found in England among the Durham coalfields. Some similar fossils have also been found in North America. A remarkable fact which has given rise to much speculation, is that the insects of the coal measures are nearly all very large, much larger than the average of present-day insects, ranging in size up to the gigantic *Meganeura*, over two feet across the wings. This may be simply because the insects existing then were all large forms, or it may be because the rock was unsuitable for preserving any more delicate animals: so far as I know the question has never been settled.

There are, of course, many more recent deposits that include insects of major importance for the study of the course of insect evolution. In the next geological system, the Permian, insects are found in its lower beds in Kansas, U.S.A., and R. J. Tillyard has described many interesting forms from the Upper Permian of New South Wales. They are also known from the Archangel district in

Russia. Triassic insects are best known from Tillyard's work on those found in Queensland. All these Permian and Triassic insects are comparatively recent discoveries; twenty years ago hardly anything was known of the insects of these periods.

England has made a considerable contribution to the insects of the next system, the Jurassic. These insects are in the Lower Lias beds of the Gloucester and Worcester region, which are in places composed of a limestone or limy mudstone thought to have been laid down near the shore of a shallow sea, into which insect remains had been carried by the rivers coming from the surrounding land.

A large number of still more recent deposits also contain insects, but these will not be mentioned here as we are chiefly concerned with the older beds, which contain insects that help us to connect the groups existing to-day, whereas after the Jurassic, no further extinctions of major groups (Orders) seem to have occurred, and most, very probably all, of the existing ones had already appeared. In fact, quite a large number of Jurassic insects are easily referable to existing families.

Before discussing the change in the composition of the insect-fauna during the various periods, we must recall the main outlines of the classification of winged insects, in order to estimate the importance of the various groups dealt with. Classificatory importance is a measure of the amount of change undergone since the groups in question diverged from a common stock, and this is, of course, *on the average*, a measure of the time which has elapsed since the groups separated.

According to modern ideas, it seems that the primary division of winged insects is into the two groups known as 'non-wing-flexing' and 'wing-flexing' insects. These are separated by the character of the mechanism for moving the wing. The non-wing-flexing forms are characterized by having fewer axillary sclerites and hence a more direct action of the thoracic muscles on the wings; and they are unable to fold their wings longitudinally down the body, as, say, a cockroach or wasp or moth are able to do, but must keep their wings perpendicular to the long axis, either flat out as is usual in anisopterid dragonflies, or folded together above the insect as in the case of some zygopterids. These insects are represented to-day by two Orders only, the dragonflies (Odonata) and mayflies (Ephemeroptera). These two Orders also differ from all other insects in that their young forms are nymphs which are, however, highly modified and divergent from the primitive form in being well adapted for an aquatic life, though their adults are aerial. They each have, in addition—but in this they do not resemble each other—one other remarkable character found nowhere else in the Insecta. The dragonflies have additional copulatory apparatus on the sternum of the second abdominal segment of the male, while the mayflies pass through two fully-winged stages, the sub-imago and the imago.

The wing-flexing insects have a larger number of axillary sclerites and the wings are moved by the thoracic muscles indirectly, through these sclerites operating on one another. There is also an additional wing-position possible—folded down the long-axis of the body. To this group belong all present-day insects, except the two Orders just mentioned. They are themselves divided into two groups; the exopterygotes, whose young are known as nymphs, that is, immature insects, which more or less resemble the adult and which grow directly towards it; and the endopterygotes, whose young are larvae, very unlike the adult and adopted for a totally different mode of life, whose growth towards the adult condition is confined to the resting pupal stage. Exopterygotes include such orders as Orthoptera, Plecoptera, Isoptera, and Hemiptera; while typical endopterygotes are Coleoptera, Hymenoptera, Mecoptera, and Lepidoptera. The endopterygotes comprise at least three separate lines of evolution, typified by

(1) Hymenoptera

(2) Coleoptera

(3) The Panorpid complex. The Mecoptera form the basal member of this group of Orders, and lead on the one hand to Diptera and Aphaniptera, and on the other to Trichoptera and Lepidoptera.

In the Carboniferous epoch very few winged insects resembling present day forms existed. Even the mayflies and dragonflies did not occur as such, but were represented by more or less ancestral (and now long extinct) orders known respectively as the Protphemeroptera and the Protodonata. Of other insects, the Orthoptera, including cockroach-like forms, were the only representatives of the exopterygotes, and no endopterygote insects of that age have yet been found. On the other hand, besides the two already mentioned a number of other Orders now extinct were living. The Protorthoptera seem to have been related to, and to connect, the Orthoptera and the Plecoptera, and hence presumably were exopterygotes. The Megasecoptera were large non-wing-flexing insects which had long cerci and well developed ovipositors (in some forms at least); their wings were narrow at the base and with simple venation without the excessive branching characteristic of most primitive insects. The Palaeodictyoptera were another most interesting group of non-wing-flexing forms. In general facies they resembled, perhaps, the modern Orthoptera, but have the very remarkable additional character of expansions on each side of the pronotum smaller than, but almost certainly similar to, the true wings, which occur in a similar position on the meso- and metathorax of all winged insects. These expansions seem to have agreed with true wings in having a venation, and their presence suggests that wings originated from a series of similar flaps, one on each thoracic segment and possibly on some abdominal segments also, but that

on only two of these segments have they developed beyond the rudimentary stage.

We may sum up the Carboniferous insect fauna as follows. It contained the extraordinary Palaeodictyoptera, which, in having prothoracic wing rudiments must be regarded as more primitive than any other insects, recent or fossil. It contained a rather large number of other non-wing-flexing forms, *e.g.*, *Protephemeroptera*, *Protodonata*, and *Megasecoptera*, and primitive exopterygotes of an orthopterous type were also numerous. But no endopterygotes, insects with a 'complete metamorphosis,' are yet known from this system.

In the Permian most of the Orders just mentioned survived, and in addition forms placed in *Odonata* and *Ephemeroptera* have been found, so that non-wing-flexing forms are still well represented. But among the wing-flexing forms, many new Orders have appeared. In the exopterygotes, *Orthoptera* are again common and bugs of the sub-order *homoptera* are well-known, while it is certain that a number of other related Orders will later be discovered. The endopterygotes, of many types but in rather small numbers, also appear: *Coleoptera* and *Neuroptera* (*Plannipennia*) are found, and a number of forms near the common stem of the *Panorpid* complex, *e.g.*, *Mecoptera*, *Paramecoptera* and *Protomecoptera*, also occur, but none of the higher *Panorpid*s have yet appeared.

Almost all the non-wing-flexing forms, except the two orders which survive to the present day, are extinct by the Trias. In this period several other present-day orders, not previously known, are found. *Heteroptera* occur for the first time, but are still much rarer than *Homoptera*, the probability being that the latter are the older group. The *Homoptera* themselves are sufficiently well-developed to include forms referable to the present-day family *Cixiidae*. The *Coleoptera* and the *Neuroptera* are equally highly developed. The *Mecoptera* now include a great number of families, some again being identical with existing ones, while another *Panorpid* order, the *Paratrachoptera*, has made its appearance. This order, together with the closely related one known as *Protodiptera*, the connecting links between the *Mecoptera* and the *Diptera*, were apparently short lived. The extreme form of these groups resembled the lower *Diptera* very closely except for the one fact that they had two similar pairs of wings, instead of having the hind wings reduced to halteres. In view of this close resemblance, it is difficult not to believe that the latter change took place very suddenly.

After the Jurassic period no more orders, so far as is known, became extinct, and nearly all the existing ones that might be expected as fossils have been found, so that the record, so far as concerns the present discussion, is complete. Two of the Orders not hitherto found are the termites and the earwigs, and as these seem to be structurally primitive, their absence is curious. A third exception

is the order Lepidoptera ; in this connection it may be noted both as larvae and as adults, nearly all Lepidoptera, except most of the Homoneura (Hepialidae, Micropterygidae) are dependent on flowering plants, and did not develop until these were to be found. Consequently the only Lepidoptera then existing were the Homoneura, which were, perhaps, as they are to-day, rather uncommon and usually minute. Ordinary Lepidoptera are frequently found in much more recent deposits.

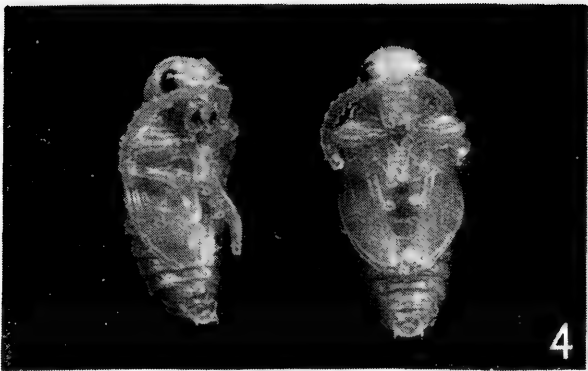




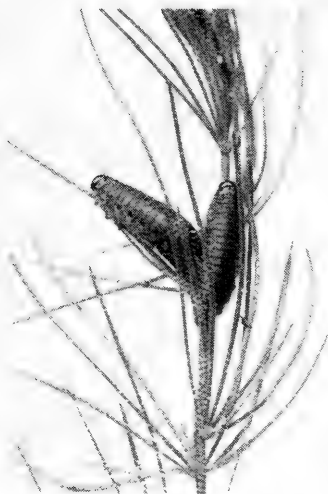
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Photo. E. J. Bunnett.

CRIOCERIS ASPARAGI, L.

Notes on the occurrence of *Crioceris asparagi*, L. in the gardens at Elstead Lodge, near Godalming, in July, 1936.

By E. J. BUNNETT, M.A.

On the occasion of the Field Meeting at Cutt Mill on 21st June, 1936, the gardens at Elstead Lodge, Godalming, were visited at the invitation of Mr. H. O. Holford, when the party had the pleasure of seeing the Asparagus beetle (*Crioceris asparagi*, L.) in all its stages.

It was then suggested that here was a good opportunity of making a photographic record of the life-history of this beetle for the Society's 'Transactions.'

For this purpose a few ova, some larvae and one or two beetles were sent to me, but as more and fresher material was desirable, I wrote for a further supply to Mr. Holford, who kindly sent me on the 3rd July, fresh branches of asparagus on which I found several batches of ova and about a score of healthy larvae.

A few days later some of these pupated, and after another week or two, the beetles began to appear, thus completing the life cycle of this beautiful insect.

EXPLANATION OF PLATE IV.

- | | | | |
|----|----------------------------------|---|----|
| 1. | Ova of <i>Crioceris asparagi</i> | × | 2. |
| 2. | „ „ „ | × | 6. |
| 3. | Larvae „ „ | × | 2. |
| 4. | Pupae „ „ | × | 6. |
| 5. | Imago „ „ | × | 2. |

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Entomological and Natural History Society

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PUBLISHED AT THE SOCIETY'S ROOMS,
HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

PRICE TEN SHILLINGS AND SIXPENCE.

Printed by T. Buncle & Co. Ltd., Market Place, Arbroath.

June 1938.

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ELECTION.

- 1933 BRETT, G. A., B.Sc., A.R.C.S., *Council*, 2 Old Claygate Lane, Hinchley Wood, Esher, Surrey. *ent*.
- 1935 BRETT, Mrs S. L. F., 2, Old Claygate Lane, Hinchley Wood, Esher, Surrey. *biology*.
- 1936 BRIEGEL, R. H., 141, Burnt Oak Lane, Sidcup, Kent.
- 1909 BRIGHT, P. M., F.R.E.S., "Nether Court," 60, Christchurch Road, Bournemouth. *l*.
- 1936 BRITTON, EVERARD, c/o Department of Entomology, Natural History Museum, Cromwell Road, S.W.7.
- 1934 BRODIE, P., B.A., 46, Mulgrave Road, Sutton, Surrey. *micro-l*.
- 1930 BROOKE, Miss W. M. A., c/o Dr Brooke, 99, The Avenue, Muswell Hill, N.10. *ec. ent, b, marine life*.
- 1936 BROWN, MAXWELL, West Kent Hotel, Bickley, Kent. *ent*.
- 1936 BUCK, F. D., 49, Elthorne Road, Holloway Road, N.19. *c*.
- 1938 BUCKLEY, W., F.R.E.S., M.I.G.A.S.E., 5, Westfield Road, Cheadle Hulme, Cheshire. *l*.
- 1909 BUCKSTONE, A. A. W., 90, Pams Way, Kingston Road, Ewell. *l*.
- 1927 BULL, G. V., B.A., M.B., *Council*, "White Gables," Sandhurst, Kent. *l*.
- 1938 BURTON, R. J., L.D.S., F.R.C.S.(ENG.), "Newlands," 212, Golders Green Road, N.W.11. *l*.
- 1938 BURTON, Miss MARGARET, "Newlands," 212, Golders Green Road, N.W.11. *biology*.
- 1922 BUSHBY, L. C., F.R.E.S., *Council*, 33c Regents Park Road, N.W.1. *c, hem*.
- 1937 CARDEW, Col. P. A., 21A, Thornton Hill, Wimbledon, S.W.19. *l*.
- 1899 CARR, Rev. F. M. B., M.A., L.TH., Ditton Vicarage, Widnes, Lancs. *l, n*.
- 1924 CHAPMAN, Miss L. M., "Arolla," Waterlow Road, Reigate.
- 1936 CHARTRES, S. A., 9, King's Drive, Eastbourne, Sussex. *ent*.
- 1922 CHEESEMAM, C. J., 100, Dallinger Road, S.E., 12. *l*.
- 1936 CLASSEY, E. W., 141, Portnall Road, Maida Hill, W.9. *ent*.
- 1915 COCKAYNE, E. A., D.M., F.R.C.P., F.R.E.S., 16, Westbourne Street, W.2. *l*.
- 1934 COLE, G., 8A, Belsize Park Gardens, N.W.3. *l*.
- 1935 COLLINS, R. J., "Appledore," Kingswood, Surrey. *l*.
- 1899 COLTHRUP, C. W., 68, Dovercourt Road, E. Dulwich, S.E.22. *l, oo, orn*.
- 1936 COOPER, B. A., 61, Okehampton Road, London, N.W.10. *ent*.
- 1907 COOTE, F. D., F.R.E.S., 32, Wickham Avenue, Cheam, Surrey. *l, b*.
- 1923 CORK, C. H., 11, Redesdale Street, Chelsea, S.W.3. *l*.
- 1919 CORNISH, G. H., 141, Kirkham Street, Plumstead Common, S.E.18. *l, c*.
- 1922 COUCHMAN, L. E., c/o Mrs A. Couchman, May Cottage, Brooklane, Bromley, Kent. *l*.

**YEAR OF
ELECTION.**

- 1909 COULSON, F. J., *Vice-President*, "Burnigill," 24, Springfield Avenue, Merton Park, S.W.20. *c, hem.*
- 1928 COURT, T. H., "Oakleigh," Market Rasen, Lincoln.
- 1937 COZENS, A. B., "Claremont," Sunninghill, Ascot, Berks. *ent.*
- 1937 CRABTREE, B. H., "Highfield," Alderley Edge, Cheshire. *l.*
- 1935 CRASKE, E. S., "Hillsboro," Gringer Hill, Maidenhead, Berks.
- 1934 CRASKE, J. C. B., F.R.E.S., 57, Cornwall Gardens, S.W.7.
- 1937 CRASKE, R. M., 12A, Lower Belgrave Street, S.W.1. *ent.*
- 1918 CRAUFURD, CLIFFORD, "Denny," Bishops Stortford. *l.*
- 1933 CREWDSON, R. C. R., F.R.E.S., "The Grange," Delamere, Northwich, Cheshire. *l.*
- 1920 CROCKER, Capt. W., Constitutional Club, Bexley Heath. *l.*
- 1898 CROW, E. J., 70, Hepworth Road, Streatham High Rd., S.W.16. *l.*
- 1932 CROW, P. N., "Heathcote," Bigfrith, Cookham Dean, Berkshire. *l.*
- 1937 CURTIS, A. E., "The Cottage," Ifold Estate, Loxwood, Billingshurst, Sussex.
- 1927 DANBY, G. C., "Sheringham," 31, Albion Road, Sutton, Surrey. *l.*
- 1925 DANNATT, WALTER, F.R.E.S., F.Z.S., 94, Guibal Road, Lee, S.E.12. *l, e l.*
- 1938 DAVIES, O. C., 33, Hopton Road, Streatham, S.W.16. *l.*
- 1900 DAY, F. H., F.R.E.S., 26, Currock Road, Carlisle. *l, c.*
- 1937 DEAL, JAMES, 18, Manor Road, West Wickham, Kent. *l.*
- 1933 DEMUTH, R. P., 7, Holland Park Avenue, W.11. *l.*
- 1889 DENNIS, A. W., 56, Romney Buildings, Millbank, S.W.1. *l, mi, b.*
- 1930 DENVIL, H. G., *Hon. Minuting Secretary*, 4, Warwick Road, Coulsdon, Surrey. *l, c.*
- 1901 DODS, A. W., 35, The Mall, Southgate, N.14. *l.*
- 1921 DOLTON, H. L., 36, Chester Street, Oxford Road, Reading. *l.*
- 1936 DOUDNEY, S. P., "Thurne," 110, Foxley Lane, Purley, Surrey. *l.*
- 1930 DOWNES, J. A., B.SC., 120, Pepys Road, Wimbledon, S.W.20. *ent, l.*
- 1930 DUDBRIDGE, B. J., B.A., Colonial Administrative Service, Tanganyika, c/o The Secretariat, Dar-es-Salaam; and 13, Church Lane, Merton Park, London, S.W.17. *ent.*
- 1927 EAGLES, T. R., *Hon. Treasurer*, 32, Abbey Road, Enfield, Middlesex. *l, c.*
- 1937 EASTON, N. T., "Akuna," Holyhead Road, Menai Bridge, Anglesey. *l.*
- 1933 ELGOOD, W. S., North Bank, Wisbech, Cambs.
- 1923 ELLIS, H. WILLOUGHBY, F.R.E.S., F.Z.S., M.B.O.U., Friary Hill, Weybridge, Surrey. *c, orn.*
- 1937 EMBRY, B., F.R.E.S., St Bartholomew's Vicarage, Dover, Kent. *l.*
- 1932 ENNIS, L. H., 16, Ernle Road, Wimbledon, S.W.20. *l.*
- 1935 ENSOR, G. A., 7, Mount Nod Road, Streatham, S.W.16.
- 1920 FARMER, J. B., 156, Loughborough Park, Brixton, S.W.9. *l.*

YEAR OF
ELECTION.

- 1924 FASSNIDGE, WM., M.A., F.R.E.S., 4, Bassett Crescent West, Southampton. *l, n, hem.*
- 1930 FERRIER, W. J., 86, Portnalls Road, Coulsdon, Surrey. *l.*
- 1936 FINNIGAN, W. J., 6, Shrublands Grove, Worcester Park, Surrey. *ent.*
- 1887 FLETCHER, W. H. B., M.A., F.R.E.S., Aldwick Manor, Bognor Regis, Sussex. (*Life Member.*) *l.*
- 1926 FLETCHER, P. BAINBRIGGE, M.SC., A.I.C., F.R.E.S., "Winscombe," Copsem Drive, Esher, Surrey. *c, l.*
- 1889 FORD, A., "South View," 42, Irving Road, West Southbourne, Bournemouth, Hants. *l, c.*
- 1920 FORD, L. T., "St Michael's," Park Hill, Bexley, Kent. *l.*
- 1915 FOSTER, T. B., "Downlands," 24, York Road, Selsdon, Surrey. *l.*
- 1907 FOUNTAINE, Miss M. E., F.R.E.S., "The Studio," 100A, Fellows Road, Hampstead, N.W.3. *l.*
- 1921 FRAMPTON, Rev. R. E. E., M.A., "Innhams Corner," Crowborough, Sussex. *l.*
- 1933 FRASER, ANGUS, "Ranelagh," Gloucester Rd., Tankerton, Kent. *c.*
- 1886 FREMLIN, Major H. S., M.R.C.S., L.R.C.P., F.R.E.S., "Heavers," Ryarsh, Kent. *l.*
- 1912 FROHAWK, F. W., F.R.E.S., M.B.O.U., "Essendene," Cavendish Road, Sutton, Surrey. *l, orn.*
- 1928 GILLES, W. S., F.R.E.S., F.I.C., "The Cottage," Bocking, Braintree, Essex. *l.*
- 1930 GILLIATT, F. T., F.R.E.S., 25, Manor Road, Folkestone, Kent. *l.*
- 1929 GLEGG, D. L., F.R.E.S., "Birchstone," Coombe Park, Kingston, Surrey. *l.*
- 1936 GOODBAN, B. S., F.R.E.S., 81, West Street, Ewell, Surrey. *l.*
- 1936 GOODE, FRANK, 275, Eastern Avenue, Ilford, Essex. *l.*
- 1935 GOODLIFFE, F. D., Lord Wandsworth Agricultural College, Long Sutton, Basingstoke. *ec. ent.*
- 1926 GORDON, D. J., B.A., F.R.E.S., "Craigellachie House," Strathpeffer, Ross. *c, l.*
- 1924 GRANT, F. T., 37, Old Road West, Gravesend. *l.*
- 1924 GREER, T., J.P., "The Bungalow," Sandholes, Dungannon, Co. Tyrone. *l.*
- 1926 GREY, Mrs OLIVE, F.Z.S., 90, Charing Cross Road, W.C.2. *ent.*
- 1933 GROCOCK, L. O., "Brasted," 53, Sherwood Road, Addiscombe, Croydon.
- 1934 GUNTON, Major H. C., M.B., F.R.E.S., "Rathgar," Gerrards Cross, Bucks. *l.*
- 1891 HAMM, A. H., A.L.S., F.R.E.S., 22, Southfields Road, Oxford. *l.*
- 1903 HARE, E. J., F.R.E.S., 41, Avenue Gardens, Acton, W.3. *l.*
- 1926 HARMSWORTH, Sir HILDEBRAND A. B., F.R.E.S., 19, Princes Gate, S.W.7.
- 1933 HARRIS, CHAS. W., 7, Roseberry Gardens, Dartford. *l.*

YEAR OF
ELECTION.

- 1937 HARRIS, H. G., M.D., B.SC. (DURHAM), 5, Archer's Road, Southampton. *l*.
- 1936 HARRIS, W. H. A., 48, Corringway, W.5. *l*.
- 1924 HARWOOD, P., F.R.E.S., Westminster Bank, 292, Wimborne Road, Winton, Bournemouth. *l*.
- 1927 HAWGOOD, D. A., 2, Kingsmead Road, Tulse Hill, S.W.2. *l*.
- 1924 HAWKINS, C. N., F.R.E.S., *Council*, 23, Wilton Crescent, Wimbledon, S.W.19. *l*.
- 1929 HAWLEY, Lt.-Col. W. G. B., D.S.O., Sibton Church Farm, Yoxford, Suffolk.
- 1923 HAYWARD, Capt. K. J., F.R.E.S., F.Z.S., F.R.G.S., Estacion Experimental, Concordia, F.C.E.R., Argentina. *l, orn, c*.
- 1937 HAYWARD, L. W., "Westoe," 31, Bower Mount Road, Maidstone, Kent. *ent*.
- 1936 HEDGES, A. V., F.R.E.S., "Milton Ernest House," Milton Ernest, Beds. *l*.
- 1920 HEMMING, Capt. A. F., C.M.G., F.Z.S., F.R.E.S., 18, Glebe Place, Chelsea, S.W.3. *l*.
- 1924 HENDERSON, J. L., 6, Haydn Avenue, Purley, Surrey. *c*.
- 1931 HESLOP, I. R. P., M.A., F.R.E.S., 34, Henleaze Gardens, Westbury-on-Trym, Bristol and Nigerian Administrative Service, Obetim, Warri Province, viâ Sapele, Southern Nigeria, West Africa. *l*.
- 1927 HEWER, H. R., M.SC., D.I.C., Royal College of Science, S. Kensington, S.W.7.
- 1937 HICK, E. PENTLAND, "Holmwood," Parkhurst Road, Bexley, Kent. *l*.
- 1920 HODGSON, S. B., "St Philips," 22, Charles Street, Berkhamsted, Herts.
- 1937 HOLFORD, H. O., "Elstead Lodge," Godalming, Surrey. *l*.
- 1937 HOPE, Dr JOHN, "Marisholm," Moseley Road, Cheadle Hulme, Cheshire. *l*.
- 1927 HOWARD, J. O. T., M.A., "Wedderburn House," Hampstead, N.W.3.
- 1931 HOWARTH, T. G., 77, Woodland Rise, Muswell Hill, N.10. *l*.
- 1934 HUGGINS, H. C., F.R.E.S., 875, London Road, Westcliff-on-Sea. *l, ent*.
- 1929 HUGHES, A. W., "Delamere," Buckingham Way, Wallington. *l*.
- 1933 HUTCHINGS, H. R., 127, Chadacre Road, Stoneleigh, Surrey. *l*.
- 1928 JACKSON, F. W. J., "The Pines," Ashted, Surrey.
- 1914 JACKSON, W. H., "Pengama," 14, Woodcote Valley Road, Purley. *l*.
- 1923 JACOBS, S. N. A., *Hon. Secretary*, "Ditchling," 54, Hayes Lane, Bromley. *l, e l*.
- 1924 JAMES, A. R., 14, Golden Lane, E.C.1. *l*.
- 1924 JAMES, R., F.R.E.S., 14, Golden Lane, E.C.1. *l*.

YEAR OF
ELECTION.

- 1936 JAMES, W. H., 41, Carson Road, Dulwich, S.E.21. *l*.
- 1927 JANSON, O. J., F.R.E.S., *Recorder*, 13, Fairfax Road, Hornsey, N.8. *ent*.
- 1925 JARVIS, C. McK., 68, Clyfford Road, West End Road, Ruislip, Middlesex. *c*.
- 1923 JOHNSTONE, J. F., F.R.E.S., "Courtlands," Clarence Parade, Southsea. *l*.
- 1933 JONES, H. G. C., "Shere," 33, Berrylands, Surbiton, Surrey. *l*.
- 1936 KENNARD, D. E. G., B.SC., 3, Vanburgh Park Road West, S.E.3. *ent*.
- 1928 KETTLEWELL, Dr H. B. D., "Homefield," The Common, Cranleigh, Surrey. *l*.
- 1933 KEYWOOD, K. P., "Croft Cottage," Hare Lane, Claygate, Surrey. *ent, orn*.
- 1910 KIDNER, A. R., "Southwood," The Drive, Sidcup, Kent. *l*.
- 1925 KIMMINS, D. E., 2, Avington Grove, Penge, S.E.,20. *l*.
- 1933 KING, H., D.SC., F.R.S., "Amanita," 28, Hawthorne Avenue, Northwick Park, Harrow. *l, orn*.
- 1925 LABOUCHERE, Lt.-Col. F. A., F.R.E.S., 15, Draycott Avenue, S.W.3.
- 1927 LAWSON, H. B., F.R.E.S., "Churchmead," Pirbright, Surrey. *l*.
- 1922 LEECHMAN, C. B., "Pansala," Roundabouts, Storrington, Sussex. *l*.
- 1914 LEEDS, H. A., Wood Walton, near Sawtrey, Huntingdon. *l*.
- 1934 LINE, H. V., "Brookside," St Peter's Road, Orpington.
- 1933 LIPSCOMB, Lieut. C. G., "Mumfords," Batheaston, Bath.
- 1936 LOWE, Capt. J. H. B., R.A. and R.E. Mess, Wana, Waziristan, India. *l*.
- 1931 MACNULTY, B. J., "Rutland," 67 All Saints Road, Sutton, Surrey. *l*.
- 1892 MAIN, H., B.SC., F.R.E.S., F.Z.S., 9, Woodside Road, Woodford Wells, Essex. *l, nat. phot, c*.
- 1889 MANSBRIDGE, W., F.R.E.S., "Monreith," Derby Road, Formby, Liverpool. *l, c, etc*.
- 1932 MARCON, Rev. J. N., Christ Church Vicarage, Seaside Road, Eastbourne. *l*.
- 1930 MARSH, D. G., "Brackla," 31, The Crossways, Sutton, Surrey. *l*.
- 1922 MASSEE, A. M., D.SC., F.R.E.S., East Malling Research Station, Kent. *l*.
- 1932 MELLOWS, W. T., M.B.E., LL.B., "Scatton," Thorpe Road, Peterborough.
- 1936 MILBORROW, G., 83, Hargwyne Street, Stockwell, S.W.9. *l*.
- 1889 MOORE, H., F.R.E.S., 9 Hoopwick Street, Deptford, S.E.8. *l, hem, d e, l, e hym, e d, mi*.
- 1930 MORLEY, A. McD., 9, Radnor Park West, Folkestone.

**YEAR OF
ELECTION.**

- 1920 MORISON, G. D., B.Sc., PH.D., F.R.E.S., Dept. Advisory Entomology, N. of Scotland Agricultural College, Marischal College, Aberdeen. *ec, ent.*
- 1937 MORTIMER, D. A., "The Mount," Dixon's Green, Dudley, Worcs. *hym.*
- 1937 MOWBRAY, M. J., 80, Woodlands Avenue, Wanstead, E.11. *ent.*
- 1935 MULLER, Miss I. M., "Appledore," Mugswell, Chipstead, Surrey.
- 1934 MUSGRAVE, A. J., 21, Loveday Road, W.13.
- 1906 NEWMAN, L. W., F.R.E.S., Salisbury Road, Bexley, Kent. *l.*
- 1930 NIBLETT, M., *Council*, 10, Greenway, Wallington, Surrey. *galls.*
- 1936 NORTON, S. G. WALLIS, "Norton House," Peaks Hill, Purley, Surrey. (*Life Member.*) *ent.*
- 1932 O'FARRELL, A. F., *Council*, 20, Crescent Rd., Wimbledon, S.W.19. *od, cr, ent.*
- 1934 OLIVER, G. B., "Hazlemere," High Wycombe, Bucks. *l.*
- 1911 PAGE, H. E., F.R.E.S., 9, Vanbrugh Hill, Blackheath, S.E.3. *l.*
- 1908 PENNINGTON, F., 47, "Apsley House," Finchley Road, N.W.8. *l.*
- 1928 PERKINS, J. F., F.R.E.S., 19, Courtfield Gardens, S.W.5. *h.*
- 1933 PEYTON, A. G., 29, Grove Road, Ramsgate. *l.*
- 1933 PINHEY, E. C. G., 70, Tisbury Road, Hove. *ent.*
- 1933 PINNIGER, E. B., 19, Endlebury Road, Chingford, E.4. *od, l.*
- 1938 POLLARD, F. W., "Ampney," St John's Avenue, Brentwood, Essex. *entom, c.*
- 1933 POOLES, S. W. P., "Richmond," Alderman's Drive, Peterborough. *l.*
- 1912 POULTON, Prof. Sir E. B., D.Sc., M.A., F.R.S., F.L.S., F.G.S., F.Z.S., F.R.E.S., "Wykeham House," Oxford. (*Hon. Member.*)
- 1927 PRATT, W. B., 10, Lion Gate Gardens, Richmond Lane, Richmond, Surrey.
- 1924 PRIEST, C. G., 67, Portland Road, Holland Park, W.11. *l.*
- 1904 PRISKE, R. A. R., F.R.E.S., 136, Coldershaw Road, W. Ealing, W.5. *l, mo.*
- 1922 RAIT-SMITH, W., F.Z.S., F.R.E.S., F.R.H.S., "Hurstleigh," Linkfield Lane, Redhill, Surrey. *l.*
- 1920 RICHARDSON, A. W., F.R.E.S., 28, Avenue Road, Southall, Middlesex. *l.*
- 1936 RICHARDSON, N. A., 68, Finchley Lane, Hendon, N.W.4. *l.*
- 1934 RIDEOUT, J. K., "Hodgsonites," Charterhouse, Godalming, Surrey. (*Life Member.*)
- 1908 RILEY, Capt. N. D., F.R.E.S., F.Z.S., 7, McKay Road, Wimbledon, S.W.20. *l.*
- 1910 ROBERTSON, G. S., M.D., "Struan," Storrington, near Pulborough, Sussex. *l.*
- 1911 ROBINSON, Lady MAUD, F.R.E.S., Kirklington Hall, Newark. *l, n.*
- 1936 ROYFFE, D. W., 2, Imperial Mansions, Bromells Road, Clapham, S.W.4. *l.*

YEAR OF
ELECTION.

- 1932 RUDLAND, W. L., 211, Caversham Road, Reading.
- 1932 RUSSELL, A. G. B., M.V.O., F.R.E.S., "Scarbank House," Swanage, Dorset. *l.*
- 1936 RUSSELL, J. A. P., "Scarbank House," Swanage, Dorset. *ent.*
- 1915 RUSSELL, S. G. CASTLE, "Springetts," Seaview Road, Highcliffe-on-Sea, Hants. *l.*
- 1936 SARD, G. J., 35, Culverden Road, Balham, S.W.12. *l.*
- 1936 SCOPES, GOWING E., "Oakhurst," Oakwood Road, Crofton, Orpington, Kent. *l.*
- 1908 ST AUBYN, Capt. J. G., F.R.E.S., F.R.P.S., 14, Purley Knoll, Purley.
- 1927 SCOTT, E., M.B., "Hayesbank," Ashford, Kent. *l.*
- 1923 SEVASTOPULO, D. G., F.R.E.S., c/o Ralli Bros., Ltd., Calcutta. (*Life Member.*) *l.*
- 1933 SHARMAN, F. W., 183, Star Road, Peterborough. *l.*
- 1910 SHELDON, W. G., F.Z.S., F.R.E.S., "West Watch," Oxted, Surrey. *l.*
- 1898 SICH, ALF., F.R.E.S., "Coburg Court Hotel," Bayswater Road, W.2. *l.*
- 1921 SMART, Major H. D., R.A.M.C., M.D., D.SC., F.R.E.S., 172, High Road, Salway Hill, Woodford Green. *l.*
- 1908 SPERRING, C. W., 8, Eastcombe Avenue, Charlton, S.E.7. *l.*
- 1927 STANLEY-SMITH, F. S., F.R.E.S., *President*, "Hatch House," Pilgrim's Hatch, near Brentwood, Essex. *l.*
- 1928 STANLEY-SMITH, Mrs MAUD, "Hatch House," Pilgrim's Hatch, near Brentwood, Essex. *l.*
- 1937 STEDALL, H. P. P., "Cherry Cottage," Prestwood, Great Missenden, Bucks. *ent.*
- 1934 STEPHENS, J. A., 44, Mount Road, Chatham.
- 1936 STIGAND, Miss B., 175, Gloucester Place, London, N.W.1. *hortic. ent.*
- 1938 STIRLING, D. H., 91, Calbourne Road, Balham, S.W.12. *l.*
- 1924 STOREY, W. H., 3, Highlands Road, Reigate, Surrey. *ent.*
- 1931 STOVIN, G. H. T., M.R.C.S., L.R.C.P., "Sevenhurst," 42, Chalkwell Avenue, Westcliff-on-Sea, Essex.
- 1936 STREETER, ERNEST, Petworth, Sussex. *l.*
- 1929 STUBBS, G. C., Government Survey Office, Kuala Lumpur, Federated States of Malay.
- 1934 SUTTON, G. R., 6, Kenilworth Gardens, Loughton, Essex.
- 1916 SYMS, E. E., F.R.E.S., *Hon. Librarian*, 22, Woodlands Avenue, Wanstead, E.11. *n, orth, od, t.*
- 1922 TAMS, W. H. T., F.R.E.S., 5, Daisy Lane, Hurlingham, S.W.6. *l.*
- 1913 TATCHELL, L., F.R.E.S., Swanage, Dorset. *l.*
- 1934 TAYLOR, J. O., "Lyndhurst," Grosvenor Road, Orpington. *l.*
- 1925 TAYLOR, J. S., M.A., F.R.E.S., P.O. Box 45, Graaffe Reinett, C.P., Union of S.A. *l.*
- 1929 TETLEY, J., "White Cottage," Silverlea Gardens, Horley.
- 1931 THOMPSON, J. A., F.R.E.S., Rhos School, Colwyn Bay, N. Wales. *l.*

YEAR OF
ELECTION.

- 1935 TOMPKINS, L. H., "Clifton," 18, Forest Side, Worcester Park, Surrey. *l.*
- 1902 TONGE, A. E., F.R.E.S., "Aincroft," Grammar School Hill, Reigate. *l.*
- 1937 TONGE, A. E., F.R.E.S., "Ashville," Trafford Road, Alderley Edge, Cheshire. *l.*
- 1934 TUNSTALL, H. G., 11, St James Avenue, Ewell, Surrey.
- 1887 TURNER, H. J., F.R.E.S., F.R.H.S., *Hon. Editor*, "Latemar," 25, West Drive, Cheam, Surrey. (*Hon. Member.*) *l, b, e l.*
- 1937 VALLINS, F. T., 2, Tattenham Grove, Epsom Downs, Surrey. *l.*
- 1889 WAINWRIGHT, C. J., F.R.E.S., 172, Hamstead Road, Handsworth, Birmingham. *l, d.*
- 1929 WAINWRIGHT, J. CHAS., 9, Priory Road, Hook Road, Surbiton, Surrey.
- 1911 WAKELY, Sir LEONARD D., K.C.I.E., C.B., 7, Parkside Gardens, Wimbleton, S.W.19. *l.*
- 1930 WAKELY, S., 4, Auckland Road, Upper Norwood, S.E.19. *l.*
- 1880 WALKER, Comm. J. J., M.A., F.L.S., F.R.E.S., "Aorangi," Lonsdale Road, Summertown, Oxford. *l, c.*
- 1936 WARRIER, R. E., 147, Friern Road, London, S.E.22. *l.*
- 1920 WATSON, D., "Crossways," Hightown, Ringwood, Hants. *l.*
- 1928 WATTS, W. J., 42, Bramerton Road, Beckenham. *c.*
- 1928 WELLS, CLIFFORD, "Dial House," Crowthorne, Berks. *l.*
- 1911 WELLS, H. O., "York Gate," Cheam Road, Ewell. *l.*
- 1937 WELTI, A., "Roswyn," 141, Perry Vale, Forest Hill, S.E.23.
- 1911 WHEELER, The Rev. G., M.A., F.Z.S., F.R.E.S., "Ellesmere," Gratwicke Road, Worthing. *l.*
- 1927 WHITE, A. G., "Hilltop," Chaldon, Surrey.
- 1934 WHITEHOUSE, Prof. Sir H. BECKWITH, M.B., M.S.LOND., F.R.C.S., F.R.E.S., 62, Hagley Road, Birmingham, 16. *l.*
- 1925 WILLIAMS, H. B., LL.D., F.R.E.S., *Vice-President*, "Croft Point," Bramley, Surrey.
- 1932 WILLIAMS, S. W. C., 17, Beresford Road, Chingford, E.4. *l.*
- 1927 WITTING, A. N., 6, Woolstone Road, Forest Hill, S.E.23.
- 1918 WOOD, H., "Albert Villa," Kennington, near Ashford, Kent. *l.*
- 1926 WOOTTON, W. J., F.R.H.S., "Wannock Gardens," Polegate, Sussex. *l.*
- 1927 BARON DE WORMS, C. M. G., M.A., PH.D., F.R.E.S., M.B.O.U., F.C.S., A.I.C., "Milton Park," Egham, Surrey. *l, orn.*

Members will greatly oblige by informing the Hon. Sec. of any errors in, additions to, or alterations required in the above Addresses and descriptions.

REPORT OF THE COUNCIL FOR 1937.

The inclement weather which prevailed up to the middle of May prevented leaf-growth, turned sallowing grounds into quagmires, put back collecting generally, and was a bad opening to what may be considered quite a successful entomological year, for, in spite of early disappointments, the good numbers attending field meetings showed maintained, or even growing interest in field work.

The membership of the Society shows an increase of two over the previous year's figure, being 256, made up of 205 full members, 46 country members, three life members, and two honorary members; there were five deaths, six resignations, and six struck off for non-payment of subscriptions, while 19 new members were elected.

There were the usual twenty-two ordinary meetings and the Annual Exhibition, and there were also seventeen field meetings, all reasonably well attended, and it is to be noted that the innovation of extending the usual twelve or thirteen meetings to seventeen was justified in the support given to them by members; moreover, there were few meetings from which members went home disappointed.

The Field Meetings were held at Effingham, Bookham, Westerham, Oxshott and Claygate, Chilworth, the Isle of Wight, Broadwater Forest, Ashted Woods, Cutt Mill, Box Hill, Forest Row, Seal Chart, Benfleet and Thames Marshes, Byfleet, Eynsford, Box Hill again, and Westerham again. They were led by Messrs Attwood, Bull, Coote, Coulson, Eagles, Hawkins, Jacobs, Niblett, Stanley-Smith, and Wakely, and the thanks of the Society are due to those members who made the arrangements for these meetings, thus contributing in no small measure to their success, and also especially to Mr Holford for the hospitality again extended to members attending the Cutt Mill meeting.

The visit to the Isle of Wight, in conjunction with the Southern Railway day excursion, was a particularly fruitful meeting, and one which, it is hoped, will be repeated.

Papers were read by Messrs Andrews, Bliss, Blair, Cockayne, Coulson, Huggins, MacNulty, Main, Williams, Wakely, and Dr Bull, all of whom have merited the Society's thanks for the time and trouble taken in the preparation of these papers.

The Annual Exhibition was as successful as ever, and the attendance of 264 members and friends, as shown by the attendance book, was the highest number so far recorded. The alteration in the structure of the hall, with the cutting off of a considerable part of the space formerly available, caused some congestion, and it is feared that there may have been some members and visitors who in consequence could not see all the exhibits. Endeavours will be made to overcome this difficulty as far as possible in future.

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The quality of exhibits was excellent and the scope as wide as ever, ranging as it did from botanical drawings and some very beautiful originals used in the production of Messrs Bright and Leeds' book on *A. coridon*, to living Reptilia. Lepidoptera, as might be expected, predominated, but other orders were well represented.

The members and visitors who contributed so largely to the success of the evening by making exhibits should be accorded the Society's warmest thanks.

The annual volume of "Proceedings and Transactions" was published in July and consists of 123 + xix pp., with four plates, and has been favourably reviewed in the various entomological periodicals; it contains several useful papers besides a full account of the Society's doings for the season.

The action of those members who provided the blocks permitting of the inclusion of the plates, and also the kindness of Mons. F. Darenne-Meyers, Editor of the Belgian paper "*Lambillionea*," in lending a line block, cannot be too highly commended. The hearty thanks of the Society are due to these gentlemen for their generosity and assistance.

Exhibits have been numerous and of good quality, and the many notes furnished testify to the growth of the habit, so long urged on members, that they should supply adequate notes with their exhibits in a form suitable for publication. Although much improved, there is still room for improvement in this respect, and it is earnestly hoped that members exhibiting will supply the Minuting Secretary not with a bare list of names, but with a concise written note of their communications at the time of exhibiting. This matter of adequate description applies more especially to the Annual Exhibition, where the Minuting Secretary cannot be expected to go round all the exhibits taking notes necessary for completing the published report. A glance at previous volumes of the Proceedings will give exhibitors an idea of the kind of note required, though there is always room for improvement. Members should, however, bear in mind that the cost of printing constitutes a large item in the Society's expenditure, and that while it is one of the objects of the Society to produce this written record of interesting exhibits and observations, there is no space for "padding," and concise reports of general interest are the matter most required by the Editorial Committee. It must also be borne in mind that because a particular exhibit may not have received much space in the Proceedings, it does not mean that that exhibit lacked interest, but rather that that interest was temporary, valuable to add interest at the meeting though possibly previously covered in notes written elsewhere.

This year marks the completion by our good friend and editor, Mr Henry J. Turner, of 50 years with the Society, and he will, we feel sure, have the good wishes of all members on this notable occasion. To show their appreciation of his long and distinguished service to the Society, the Officers and Council have decided to confer on Mr Turner an

Honorary Membership of the Society (under bye-law No. 8), and they feel sure you will all agree that he has fully merited the distinction.

The Librarian reports that during the year the growth of the library has continued, there having been an increase in the number of volumes added and also in the number of books borrowed by our members.

The Curator reports that donations to the Society's collections during the past year include ninety-five specimens covering twenty-five species of Palaearctic Butterflies from the trustees of the British Museum (Natural History).

Other donations were received from Dr K. G. Blair, Dr G. V. Bull, Messrs J. T. Atkinson, E. J. Collins, F. J. Grant, S. N. A. Jacobs, and H. G. Tunstall.

HON. TREASURER'S REPORT, 1937.

My report this year will have to be somewhat longer than usual. This is because the form of the accounts has been altered.

In February last the Council instructed me to draw up a revised form of account for 1936 for their consideration. Mr F. Stanley-Smith helped me greatly in the task of re-arranging the figures, Mr Hawkins put me right on a question of the Rules, and Mr Syms kindly asked his nephew, a qualified accountant, to put the figures in approved form. They were then submitted to the Council and considered at two meetings.

The resulting 1936 account is published for your information, but does not supersede the audited account already published. I shall, in this report, connect the figures in the revised 1936 account with those in the 1936 audited account published last year. The 1937 account will, of course, connect with the revised 1936 account and thus the continuity of the Society's accounts will be maintained.

The first thing perhaps to comment on when comparing the new 1936 accounts with the audited one is that the investments figure at £982 6s 1d instead of at £1118 10s 7d. This is because they are now put in at cost instead of at market value. A note of their market value will be published each year and I trust it will always exceed the cost. On the left-hand side of the Balance Sheet will be found the Capital Fund, £987 5s 4d. There is a Capital Account showing how this is got at, but the balance with which this Account opens, namely, £986 5s 4d, requires explanation. It is an item which I built up from the Suspense Account in the old ledger. Mr Syms kindly found this book for me. The Society's investments have all been purchased out of sums carried to a Suspense Account in accordance with Rule 10 (e) and 10 (f). This account was opened in 1893. For many years it was fed only by Entrance Fees and Life Members' Fees. By 1919 it had crept up to £57 17s 6d. The year 1920 was marked by a record number of Entrance Fees and the making of the first investment. Two National War Bonds of £30 were bought for £57 19s 2d. In 1921 the Society received a generous bequest of cabinets, books, etc. All who use the library will have reason to be grateful to the memory of W. J. Ashdown. Duplicate books were sold, also cabinets which the Society could not then accommodate. The various lots produced a total of £77 2s 1d. It would seem, moreover, that this bequest enabled the Society to part with sundry items (cabinets, etc.) it had previously acquired, for about this time sales of such produced £24 11s.

In 1922 £40 of National War Bonds were bought for £41 10s 10d.

In 1924 there came to the Society a most handsome gift of £300 from the Misses E. F. and L. M. Chapman, in memory of their brother, the illustrious Dr Chapman. The money was "to be invested and the income devoted to cost of publications." It was put into 5% War Loan, the leading Trustee Stock of those days. As you all know, this became later the 3½% War Loan, and as such you will find it in present-day Balance Sheets.

Encouraged by this good fortune the Society in April 1924 invested in a further £30 of National War Bonds. Towards the end of 1924 came the Lachlan Gibb bequest of £200, with which £250 of 3½% Conversion Loan was bought early in 1925. A further £40 of this security was bought in 1926.

The National War Bonds of face value £130 matured in 1929 and were converted successively into Treasury Bonds and 4% Consols. Their face value in the last-named security became £154 14s, in which form they will be recognised in the latest Balance Sheets.

Major Lile in 1931 left us £50 which, after paying legacy duty, yielded £44 13s 3d. At the time there was some £30 in hand waiting investment. In order to be able to invest a round sum of £100 a transfer of £30 was made from the General Fund. With the £100 a purchase of £101 15s 3d of 3½% Conversion Loan was made, bringing the total holding up to a face value of £391 15s 3d.

In 1935 we received Mr Robert Adkin's bequest of £200. This was slightly supplemented to enable us to make our latest investment of £200 of 3½% Conversion Loan. Our holding was thus brought up to £591 15s 3d, at which figure it stands to-day.

A summary of the Suspense Account from 1893 to 31st December 1935 is published as a matter of interest. You will see it ends with a balance of £3 19s 3d, which you will find in the Suspense Account at 31/12/'35 as published in the 1935/'36 Proceedings.

Continuing our examination of the revised Balance Sheet of 1935 the item of £36 18s Balance at 31st December 1935 calls for an explanation. It is reconciled with the amount of £47 18s, the balance of Revenue Account, by deducting £16 for subscriptions paid in advance during 1935 and adding £5 for the estimated value of subscriptions due but unpaid at 31st December 1935.

The description "Income and Expenditure Account" is used instead of Revenue Account. Perhaps the first thing that strikes one is to ask why the new method of drawing up the Account should result in the subscriptions of the year being shown at a slightly higher figure. The explanation lies in the treatment of subscriptions paid in advance. In the new method these are not brought into Revenue Account but are held in the Balance Sheet among the liabilities. Thus to reconcile the new figure with the old it is necessary to deduct the sum of £14 17s 6d received in advance in 1936 and to add the £16 received in advance in 1935. In the old Account there was £2 7s 3d for Income Tax. This is divided into 2s 11d, which you will find deducted from

the deposit interest because it refers to that interest, and £2 4s 4d which you will find deducted from the £10 10s War Loan interest in the Publication Fund. It is considered more correct to charge the Publication Fund with its own Income Tax but it makes no ultimate difference to the Revenue Account, because the Revenue Account (or the Income and Expenditure Account, as it is now called) has to make a greater grant to the Publication Fund. This leads to the task of reconciling the grants in the old Account with the corresponding figures in the new. To the £62 in the old Account must be added the £2 4s 4d Income Tax just referred to and a sum of £3 10s Postage of Publications.

The next Account in the new form is headed Capital Account and is the successor to the Suspense Account in the old form. The balance with which this Account opens has already been explained. The transfer of £1 10s from the Capital Account to the Library Fund corresponds to the grant of £5 from the old Revenue Account. The amount is £3 10s less because the Library Fund has been relieved of the £3 10s Postage of Proceedings.

What has just been said explains the difference between the present and former figures of the Library Fund.

The changes in the figures of the Publications Fund have also been explained above, because they are that the Publications Fund is made to bear the Income Tax on the interest arising from its Endowment. It has also been made to bear the cost of distributing the Proceedings. And as stated before it has had to have in consequence a larger grant from the Income and Expenditure Account.

You will no doubt be glad to hear that one of the Funds, the Illustrations, survives without alteration.

I hope that the new form of Accounts will be helpful to you. I realize that it will be when you have the figures and report before you in print that you will be able to criticise them and I shall be happy at any time to give all explanations in my power and to note suggestions for consideration next year. Perhaps to-night some members would like to study the figures.

I now turn from the special matters arising out of the change in the style of the Accounts and proceed to comment on the 1937 Accounts and to compare the results shown with those of 1936. In doing this I must take the 1936 Accounts as revised.

Looking at the assets in the Balance Sheet you will see there is a small depreciation in the value of our investments. Government stocks have fallen slightly during the year and our securities are worth £41 less than last time. Our Current Account Balance at the Bank is up by £26, more than half of this increase being due to the additional £14 standing to the credit of the Illustrations Fund.

The Income and Expenditure Account shows that we are still paying our way despite the fact that we had to face a demand of £7 9s 11d for back Income Tax. By an oversight the income from the £154 4s

of 4% Consols had been omitted from the returns. When this was discovered we were called upon to pay for six years. You may be surprised to know that our income from investments is liable to Income Tax, but such is the fact. Otherwise the Income and Expenditure Account is much the same as last year. The Subscription Account is almost the same, a mere 10s more than last year. Donations towards the Exhibition Expenses (the Refreshment Fund) produced some 50s more, but on the other side the bill was 21s more. I do not resent the increase in this bill because it arises from an increased attendance. The transfer to the Publications Fund is £67, almost exactly the same as last year.

Turning to the Capital Account we find an item of £8 8s Life Members' Composition. The rules prescribe that such receipts must be used for Capital purposes. Entrance fees are slightly up, a healthy sign. From Capital an amount of £7 is transferred to the Library Fund. Last year the corresponding figure was only 30s. The increase is because we have spent more money this year on new books.

This year's Publication Fund figures differ from last year's in fractions only. By a coincidence the cost of printing the volume was almost exactly the same as last year. There is a slight increase in the donations to this Fund; I thank the givers and hope their example will be followed by others.

Again we have to thank a generous but anonymous friend for a donation of £20 to the Illustrations Fund. There is £18 16s 7d to the credit of this Fund.

Mr F. D. Coote, on behalf of the Council, and Mr G. R. Sutton, on behalf of other members, were appointed auditors. They were kind enough to promise to come to Enfield for the audit. Unfortunately, two of my children were taken ill with an infectious complaint. It was considered safer to postpone the audit, but this will be done before the Accounts are printed.

I hope you will then carefully examine the Accounts at your leisure. They are here for inspection to-night, and I shall be happy to answer any questions so far as I can.

Before I close I want to draw your attention to the form of Bankers Order at the end of the current Proceedings. This is a very simple form to fill up. It saves postage and trouble, both to the members and to the Society. There is no real commitment, because the order can be revoked as easily as it is given and the amount being small does not materially affect one's Banking Account.

Note.—The Accounts were audited by Mr F. D. Coote and Mr G. R. Sutton on February 19th, 1938.

The South London Entomological and Natural History Society.

BALANCE SHEET at 31st December 1936.

[illegible]

NOTE.—The Society's Books, Cabinets, Collections, etc., are insured for £1000.

INCOME AND EXPENDITURE ACCOUNT—Year to December 1936.

Rent of Rooms ...	...	...	...	£50 0 0	...	Subscriptions (Arrears and Current) ...	...	£136 7 6
Insurance ...	...	...	...	1 10 9	...	Interest—	...	
Attendance ...	...	...	...	2 10 0	...	£154 14s 0d 4% Consols ...	£6 3 8	
Secretarial Expenses ...	...	...	...	9 10 0	...	£591 15s 3d 3½% Conversion Loan ...	15 18 5	
Treasurer's Expenses ...	...	...	...	3 18 8	...	(£20 14s 2d, less tax, £4 15s 9d)		
					£67 9 5	Deposit Account (13/-, less tax, 2/11) ...	0 10 1	
Subscriptions—						Exhibition Expenses (Donations towards) ...	...	22 12 2
South Eastern Union of Scientific Societies ...	...	...	...	£0 15 0	...		...	15 4 6
Commons, Open Spaces, and Footpaths Preservation Society ...	...	...	...	0 10 6	...			
Exhibition Expenses ...	...	...	...	1 5 6	...			
Bank Charges—				21 10 0	...			
Cost of transferring investments on appointment of new Trustee ...	...	...	...	£1 5 0	...			
Cheque Book ...	...	...	...	0 4 2	...			
Grant to Publication Fund ...	...	...	...	1 9 2	...			
				67 14 4	...			
				£159 8 5	...			
Balance, being excess of Income over Expenditure carried to Balance Sheet ...	...	...	...	14 15 9	...			
				£174 4 2	...			£174 4 2

CAPITAL ACCOUNT—Year to 31st December 1936.

Transfer to Library Fund ...	...	...	...	£1 10 0	...	Balance at 31st December 1935 ...	...	£986 5 4
Balance at 31st December 1936 ...	...	...	...	987 5 4	...	Entrance ...	...	2 10 0
				£988 15 4	...			£988 15 4

LIBRARY FUND—Year to 31st December 1936.

Books purchased	...	...	£0 8 6	Balance at 31st December 1935	...	...	£1 18 2
Binding	...	...	0 18 0	Transfer from Capital Account	...	...	1 10 0
Subscription to Entomologist's Monthly Magazine	...	...	0 15 0				
Balance at 31st December 1936	...	...	£2 1 6				
			1 6 8				
			£3 8 2				£3 8 2

PUELICATION FUND—Year to 31st December 1936.

Printing Proceedings	...	...	£77 5 5	Balance at 31st December 1935	...	...	£0 14 8
Postage of same	...	...	3 10 0	Transfer from Income and Expenditure Account	...	...	£67 14 4
Balance at 31st December 1936	...	...	£80 15 5	Interest on £300 3½% War Loan (Misses E. F. & L. M. Chapman)	...	8 5 8	
			1 7 9	£10 10s, less tax, £2 4s 4d	...	2 4 6	
				Donations	...	3 4 0	
				Sale of Proceedings	...		81 8 6
							£92 3 2

ILLUSTRATIONS FUND—Year to 31st December 1936.

Blocks	...	...	£8 11 6	Donation	...	...	£20 0 0
Printing illustrations	...	...	6 4 0				
Balance at 31st December 1936	...	...	£14 15 6				
			5 4 6				
			£20 0 0				£20 0 0

SUSPENSE ACCOUNT—1893 to 1935 (both inclusive).

25/2/1924.					Face Value.	Cost.
Gift from the Misses Chapman	...	...	£300	0	0	
24/12/1924.					£250 of 3½% Conversion Loan	... £199 3 6
Lachlan-Gibb Bequest	...	...	...	200	0	0
11/12/1931.					£40 of 3½% Conversion Loan	... 31 2 0
Lille Bequest	...	...	...	44	13	3
18/10/1935.					£101 15s 3d Conversion Loan	... 100 0 0
Robert Adkin Bequest	...	...	...	200	0	0
					£200 of 3½% Conversion Loan	... 215 6 0
					Total, £591 15s 3d.	— £545 11 6
Sale of Ashdown Cabinets etc., 1921/1927	...	...	...	77	2	1
Sale of Assets, 1922/1930	...	...	...	24	11	0
Entrance Fees	...	...	...	72	3	0
Life Members' Compositions	...	...	...	37	16	0
Grant from General Fund, 1931	...	...	...	30	0	0
					£30 National War Bonds	... £29 6 6
					£30 National War Bonds	... 28 12 8
					£40 National War Bonds	... 41 10 10
					£30 National War Bonds	... 32 4 10
					(now £151 of 4% Consols)	131 14 10
					5% (now 3½%) War Loan	... 304 19 9
					31/12/1935 Balance	... 3 19 3
						£986 5 4

BALANCE SHEET at 31st December 1937.

Capital Fund—		Investments at Cost—	
General	...	General (including Ashdown, Lachlan-Gibb, Lile, and Robert Adkin bequests)	...
Publication	...	£591 15s 3d 3½% Conversion Loan ...	£545 11 6
	...	£154 14s 0d 4% Consols ...	131 14 10
	...		£677 6 4
Special Funds—			
Library	...	Publication (Gift of the Misses E. F. & L. M. Chapman in memory of their brother)	...
Publication	...	£300 3½% War Loan ...	304 19 9
Illustrations	...		£982 6 1
	...	Note—Market value at 31st December 1937, £1077 5s 8d.	
Subscriptions paid in advance	...	Sundry Debtors—	
Income and Expenditure Account—		Subscriptions in arrear valued at	...
Balance at 31st of December 1936 ...	£51 13 9	Cash at Bank—	5 0 0
Add Excess of Income over Expenditure of the year ...	6 12 3	Deposit Account ...	£26 18 4
		Current Account	70 10 10
		Cash in hand ...	97 9 2
			2 12 4
			£1087 7 7

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Examined and found correct, 19th February 1938.

F. D. COOTE, *Auditor*.

GRESHAM R. SUTTON, *Auditor*.

T. R. EAGLES, *Hon. Treasurer*.

NOTE.—The Society's Books, Cabinets, Collections, etc., are insured for £1000.

INCOME AND EXPENDITURE ACCOUNT—Year to 31st December 1937.

Rent of Rooms	...	...	£50 0 0	Subscriptions (Arrears and Current)	...	...	£136 17 6
Insurance	...	...	1 10 9	Interest—			
Attendance	...	...	2 10 0	£154 14s 0d 4% Consols	...	£6 3 8	
Secretarial Expenses	...	...	11 8 3	£591 15s 3d 3½% Conversion Loan	...	20 14 2	
Treasurer's Expenses	...	...	3 17 9	Deposit Interest	...	0 13 0	
			£69 6 9				
Subscriptions—							
South Eastern Union of Scientific Societies	...	...	£0 15 0	Income Tax	...	6 12 11	£27 10 10
Commons, Open Spaces, and Footpaths Preservation Society	...	...	0 10 6	Exhibition Expenses (Donations towards)	...	20 17 11	17 15 0
Exhibition Expenses	...	...	1 5 6				
Hire of Projector	...	...	22 11 0				
Arrears of Income Tax on Interest on 4% Consols	...	...	1 5 0				
Grant to Publications Fund	...	...	7 9 11				
			67 0 0				
			£168 18 2				
Balance, being the Excess of Income over Expenditure carried to Balance Sheet	...	...	6 12 3				
			£175 10 5				£175 10 5

CAPITAL ACCOUNT—Year to 31st December 1937.

Transfer to Library Fund	...	...	£7 0 0	Balance at 31st December 1936	...	...	£987 5 4
Balance at 31st December 1937	...	...	991 5 10	Entrance Fees	...	...	2 12 6
				Life Member's Composition	...	...	8 8 0
			£998 5 10				£998 5 10

LIBRARY FUND—Year to 31st December 1937.

Books purchased	...	...	...	...	£4 10 0	Balance at 31st December 1936	...	...	£1 6 8
Binding	...	...	...	...	1 9 0	Transfer from Capital Account	...	...	7 0 0
Subscription to Entomologist's Monthly Magazine	...	...	...	...	0 15 0				
Balance at 31st December 1937	...	...	...	...	1 12 8				
					£8 6 8				£8 6 8

PUBLICATION FUND—Year to 31st December 1937.

Printing Proceedings	...	...	...	£77 14 2	Balance at 31st December 1936	...	...	£1 7 9
Postage of same	...	...	...	3 10 3	Transfer from Income and Expenditure Account	...	...	£67 0 0
Balance at 31st December 1937	...	...	...	£81 4 5	Interest on 3½% War Loan (Misses E. F. and L. M. Chapman)	...	...
				1 3 0	£10 10s 0d, less Income Tax,	
					£2 9s 10d	8 0 2
					Donations	2 7 0
					Sale of Proceedings	3 12 6
								80 19 8
								£82 7 5

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ILLUSTRATIONS FUND—Year to 31st December 1937.

Blocks	£3 5 5	Balance at 31st December 1936	£5 4 6
Printing illustrations	...	...	...	3 2 6	Donation	...	...	20 0 0
Balance at 31st December 1937	...	...	...	£6 7 11				
				18 16 7				
				£25 4 6				£25 4 6

ABSTRACT OF PROCEEDINGS.

11th FEBRUARY 1937.

Mr F. J. COULSON, PRESIDENT, in the Chair.

Mr Priske exhibited a series of the Mollusc shell, *Helix arbustorum*, L., from various localities together with specimens from the same places, and coloured drawings of *Helix itala*, for comparison. He also showed a series of colour aberrations of the Coleopteron, *Donacia sericea*, L.

Mr A. Bliss exhibited a specimen of the Neuropteron, *Ascalaphus coccajus*, Schiff., from the neighbourhood of Geneva. The *Ascalaphidae* are closely related to the "Ant-lions" (*Myrmeleonidae*), from which they differ in the possession of long knobbed antennae. In appearance and in flight they somewhat resemble the Dragonflies, but have a very different life-history.

Mr S. R. Ashby exhibited a collection of Mutillid Hymenoptera from many parts of the world and said that the species were attached to different species of Bees.

Mr M. Niblett exhibited a collection of the puparia of Trypetid Flies (Dip.) and read the following Notes:—"Totally enclosed puparia, i.e., in hard galls or cocoons, are all light-coloured, except *Tephritis hyoscyami* and *T. bardanae*, which are black and are cemented together in a solid mass with seeds and pappus hairs. Puparia in achenes are also light in colour. *Orellia tussilaginis* in seeds of Burdock is a large insect for the space it occupies, but the larva produces no appreciable swelling of the seed containing it. *Urophora quadrifasciata* larva causes the walls of the seed to distend, in fact it outgrows its shelter. When full fed it is only partially enclosed and the puparia may be found loose in the dry flower-heads of its host-plant, Black Knapweed. These larvae must turn round in the seeds as the imago appears to emerge through the hole made by the larva in entering the seed.

Orellia falcata larvae are root-feeders on Goat's-beard, but work up to the lower part of the stem to pupate; their puparia are also light-coloured. Two gall causers have puparia which are brown or black, but here the galls are more or less loose in texture. They are *Sphenella marginata* in swollen flower-heads of Groundsel and Ragwort, and *Noëta pupillata* in Hawkweeds. The larvae of the latter are dark grey, but one light-coloured larva gave a white puparium. The puparia of the species pupating in the earth vary in colour. *Phagocarpus permundus* is white, while *Gonioglossum wiedemanni* changes from deep yellow to brown within 24 hours. Those lying loose in flower heads also vary in colour, light brown predominating. Cocoons formed of pappus hairs by the larvae vary from very slight as in *Orellia winthemi* to very dense ones as those of *O. colon* and *O. ruficauda*.

The Puparia of *Trypetidae* exhibited were:—*Urophora stylata*, Fab., *U. solstitialis*, L., *U. quadrifasciata*, Mg., *Myopites longirostris*, Lw., *Sphenella marginata*, Fal., *Noeëta pupillata*, Fal., *Gonioglossum wiedemanni*, Mg., *Phagocarpus permundus*, Har., *Acidia cognata*, Wied., *Trypeta zoë*, Mg., *Rhagoletis alternata*, Fal., *Orellia tussilaginis*, Fab., *O. falcata*, Scop., *O. colon*, Mg., *O. ruficauda*, F., *O. winthemi*, Mg., *Ceriocera ceratocera*, Hend., *Paroxyna plantaginis*, Hal., *Chaestomella onotrophes*, Lw., *Xyphosia miliaria*, Schr., *Ensina sonchi*, L., *Tephritis bardanae*, Schr., *T. hyoscyami*, L., *Terellia serratulae*, L., *T. longicauda*, Mg.

Mr Hawkins showed a cast in flint of the fossil Echinoderm, *Echinocorys vulgaris*, Breynius, found on Wimbledon Common, near the so-called Cæsar's Camp, in 1934. He said it was an Upper Cretaceous genus and a White Chalk species.

Mr C. J. Coulson exhibited:—(1) Box of Homoptera, Families *Cercopidae*, *Membracidae* and in part *Jassidae*, including named forms of *Philaenus spumarius*, L., and selected forms connecting the plain and mottled forms. Also the black form of *Philaenus lineatus*, L. (2) Box of Coleoptera, Families *Scydmaenidae*, *Clavigeridae* and *Pselaphidae*. (3) Series of *Lathrobium elongatum*, Gr., a local species from Bookham Common, 1st February 1937. It occurs under bark of half-submerged branches in swampy tracts.

Mr H. W. Andrews exhibited the following species of Diptera:—*Trypeta vectensis*, Collin., a species new to science, from Cranmore, I. of Wight, subsequently bred from seed-heads of *Serratula tinctoria*, L. (Saw-wort), from the same locality; *Urophora spoliata*, Hal., a species of Trypetid which had been "lost" since 1839, bred from the same seed-heads; and *Platyparea poeciloptera*, Schr., "The Asparagus Fly," found in S. Herts in 1935 infesting asparagus beds. An addition to the British list.

Mr T. R. Eagles exhibited a tick, *Hyalomma syriacum*, Koch, taken from a tortoise; and the Orthopteron, *Ectobius lapponica*, Fb., taken on the occasion of the Field Meeting at Cutt Mill, 21.vi.36.

Dr G. V. Bull recorded the parasite *Apanteles fraternus*, Rein., from *Sterrha ochrata*, Scop. (*ochrearia*, Hb.).

25th FEBRUARY 1937.

The PRESIDENT in the Chair.

Mr Eagles exhibited a larva and imagines of the beetle, *Melasis buprestoides*, L., the latter in their winter resting position in tunnels bored in the wood of hornbeam; and also larvae and imagines of the beetle, *Endomychus coccineus*, L.

Mr Stanley Smith exhibited an aberration of *Vanessa* (*Aglais*) *urticae*, L., and a gynandromorph of *Polygonia c-album*, L., both on behalf of a visitor, Mr W. Quibell. R. underside ♀. L. underside ♂.



PARTICULARS OF A VAR. OF *V. URTICAE*

taken at Brampton, Huntingdon, on the 4th October 1936,
by W. Quibell.

Forewings are of the usual reddish orange ground colour without yellow patches, two spots missing on each wing. All spots on fore costa joined to form a more or less black patch. Outer fringes and borders, except veins or radiations, are of a creamy tint dusted with brown. No blue crescents.

Hindwings slightly darker than normal, fringes cream, lilac coloured crescents.



VANESSA (AGLAIS) URTICAE, L. ab. x 2.



Dr E. A. Cockayne read notes on the curious developments in the name of the British species of *Procris*:—For many years we were accustomed to call our British species *globulariae*, Hb., and only recently have followed Jordan, who in Seitz said he thought our species should be called *cognata*, H-S. Alberti, "*Int. Ent. Zeitschr.*," 1937, L. 513, now tells us that we were right all the time and that our species really is *globulariae*, Hb. He also says that the species we now call *globulariae* is really *notata*, Zell., while *globulariae*, var. *subsolana* (Jordan in Seitz) is the species originally named by Rambur from Spanish specimens, and should be called *cognata*, Rmb. *Cognata*, H-S., is a synonym and should be dropped. In Britain there appears to be only one of these three species—*globulariae*, Hb. All the Sussex specimens examined and those from the Cotswolds, where it was recently rediscovered by Professor T. Bainbrigge Fletcher, are alike. In Germany *notata*, as we are told we must now call it, was thought to be the common species, but *globulariae* has been found to have a wide distribution and to be the commoner. Often both are found flying together. Alberti says that, to his surprise, the third species, *cognata*, Rmb., has recently been found in Central Germany and the Rhineland.

In our paper in "*Ent. Record*," 1932, xliv, 17, Mr Hawkins and I pointed out that three different larvae have been figured, all mining in *Centaurea*, *Scabiosa*, or *Globularia* or in more than one of them, and suggested that there were three distinct species of *Procris* with this habit. Alberti has now proved that our surmise was correct, though not by examining the genitalia of Moths bred from the two kinds of green larva, as we suggested. There are, therefore, in Germany, if Alberti's nomenclature is correct:—

- (1) *globulariae*, Hb. Valve with upper and lower portions of nearly equal length, and with a long thin process arising from the base. Oedaeagus thick and without spines. Larva brown.
- (2) *notata*, Zell. Valve with upper portion only slightly longer than lower, and without basal process. Oedaeagus very thin with a bulbous expansion at base, and with a chitinous thread running its whole length. The larva first described by Schmidt, and figured by Freyer, Kirby, Hoffmann and Spuler, probably belongs to this species. Grey or green with yellow dorsal line, dorsal black spots triangular and uniting across midline. Tubercles red.
- (3) *cognata*, Rmb. Upper portion of valve much longer than lower, with no basal process. Oedaeagus thick with three large and one small spine, one large one near distal end. The larva figured by Buckler probably belongs to this species. Green, with no yellow dorsal line; dorsal spots rounded and not meeting across midline. Tubercles blue-green or green.*

*In our summary we are made to say, by a printer's error, *with* red tubercles, when it is obvious from the context that *without* red tubercles is intended.

Following on Mr Bliss's exhibit at the last meeting Mr Turner showed some *Myrmeleonidae*, *Ascalaphidae*, etc., including:—1. *Myrmeleon formicarius*, L., ♂ and ♀ from Europe and a S. African species sent by our fellow member, Mr J. Sneyd Taylor from Barbaraton. All the species in this family have short antennae and the larvae make pitfalls in sand and often progress backwards. 2. Species of *Ascalaphus*, which have extremely long antennae, knobbed at the end, and in their larval habits neither make pitfalls nor progress backwards. The species shown were *A. italicus*, Fb.; *A. meridionalis*, Charp.; *A. longicornis*, L.; and *A. coccajus*, Schiff., or *A. barbarus*, L., all of which come from the lands bordering on the northern shores of the Mediterranean. 3. The curiously shaped *Nemoptera lusitanica*, Leach, in which the head is "more or less produced and beak-like," the antennae filiform, and hind-wings of a peculiar "elongate and strap-like shape." Spain.

Mr Grocock, in presenting the Society, on behalf of the Croydon Natural History Society, with a copy of the first portion of "The Atlas of Croydon," which was in course of compilation and publication, described the object of his Society in undertaking the project.

A paper entitled "Changes in the Insect Fauna of Gt. Britain in the past hundred years," by Dr K. G. Blair, was, in the absence of the author, read by Mr Eagles. A rather extended discussion took place, many members taking part. (See *Trans.*)

11th MARCH 1937.

The PRESIDENT in the Chair.

Messrs A. B. Cozens, of Ascot, Berks; D. E. Ballinger, Acton, W.3; and A. E. Curtis, Billingshurst, Sussex, were elected Members.

Dr E. A. Cockayne exhibited specimens of *Xylomiges conspicillaris*, L., including its form *melaleuca*, View.

Mr Grant exhibited a beetle found by workmen at the docks. It was suggested it might be related to the genus *Melolontha*.

Mr Eagles exhibited larvae of the elm bark beetle, *Scolytus destructor*, Ol., and of the predator, *Aulonium trisulcum*, Geoff., from Broxbourne, Herts.

Mr Huggins exhibited four almost completely white specimens of *Scoparia dubitalis*, Hb.; an extreme banded form of *Leucania favicolor*, Barr.; examples of *Scopula fulvalis*, Hb., *Ephestia semirufa*, Stain., and *Gymnancyla canella*, Hb.; a *Pyrallis lienigialis*, Zell., from Bourton-on-the-Water; the Psychid *Pachythelia villosella*, Ochs., and its case; and the salt-marsh form *rubescana*, Const., of *Catoptria aspidiscana*, Hb., discovered by himself in Kent some years ago.

Mr Huggins then read a short paper on *Pachythelia villosella*, Ochs., and a discussion ensued. (See *Trans.*)

25th MARCH 1937.

The PRESIDENT in the Chair.

Mr M. Niblett exhibited the following species of *Trypetidae* (Dip.): —*Euribia solstitialis*, L., *E. cuspidata*, Meig., *E. jaceana*, Her., and *Ceriocera (Trypeta) microceras*, Her., and the gall of *Trypanea dumosa*, Mro., in flower-heads of *Elytropappus rhinocerotis*, from South Africa.

Dr Cockayne exhibited two examples of *Parasemia plantaginis*, L., ♀ with white ground colour to the hind wings, a form of the female of which he could find no previous record.

Mr T. R. Eagles exhibited pupal tunnels of *Brephos notha*, Hb.

Mr Attwood exhibited the swellings (galls) of Aspen stems caused by the feeding of the larvae of the Coleopteron, *Saperda populnea*, L., from Benfleet, Essex.

Mr R. J. Musgrave exhibited *Trypoxylon figulus*, L. (?), a species of Hymenoptera, Superfamily Sphecoidea, Family *Trypoxylonidae* bred in the laboratory, S. Kensington, 23.iii.37. Its nests were divided into cells, and spiders are used as food (teste Dr O. W. Richards).

Mr Downes exhibited a flower of the Green Hellebore, *Helleborus viridis*, L., from Surrey.

Mr Dennis showed a series of beautiful lantern slides of British trees at different seasons, depicting flowers, fruit, and winter state.

8th APRIL 1937.

The PRESIDENT in the Chair.

Mr Bernard P. Embry, St Bartholomew's Vicarage, Dover, Kent, was elected a country member.

Mr S. Wakely exhibited a specimen of *Opogona antistacta*, Meyrick, a moth new to science, bred from a larva found in a bunch of bananas, feeding in a slight tubular web on the surface of the fruit. The species has only recently been described.

Dr E. A. Cockayne exhibited examples of *Monima (Taeniocampa) gothica*, L., with its obsolete form, *gothicina*, H.-S., in which the usual black "gothic" mark is more of the ground colour.

Mr A. Bliss exhibited a cabinet drawer containing Lepidoptera taken during a fortnight in the Haute Savoie about the beginning of June, in illustration of the short paper he read later in the evening.

Dr Bull exhibited the living larva of *Brenthis euphrosyne*, L., from E. Sussex.

Mr H. Main exhibited living specimens of the tortoise beetle, *Cassida rubiginosa*, Müll., which he had successfully kept through hibernation. Also a drawing and a photograph of the "false scorpion," *Chelifer latreillii*, Leach, and cells used in his observations on this species.

Mr E. Niblett exhibited galls on leaves of Ground-Ivy caused by the Cynipid, *Liposthenes latreillei*, Kief., which emerged, 24.iii.37; also Chalcid parasites. The galls were found at the Society's Field Meeting at Epsom, July 1936.

Mr G. A. Brett exhibited a cage made from photographic half-plates stuck together with gum-strip paper in such a way that they hinge. The cage can thus be taken to pieces and folded into a small space for packing, and is therefore useful for taking away. When set up the foodstuff is pushed through the holes in the bottom and the cage is stood on a jar full of water. The tops can be made either of muslin on a wire frame, or of perforated zinc. This latter can either have the edges bent over, or be fixed to a wooden frame, but for packing the wooden frame is far better.

These cages were described in his paper on *H. abruptaria*. ("Proc. S.L. Ent. Nat. Hist. Soc.," 1935-36, p. 84.)

Mr Wallis Norton exhibited a motorist's "grease gun" which he had adapted for use when "sugaring."

Mr F. J. Coulson exhibited an aberration of the Noctuid, *Amphipyra pyramidea*, L., taken at Chingford in August 1905, in which the light external edging of the elbowed line is broadened into a clear broad band.

Mr R. W. Attwood exhibited the larval nest of *Nygmia (Euproctis) phaeorrhoea*, Haw. (Brown Tail), from Canvey Island, Essex, together with the larvae and pupae of the beetle, *Anthrenus musaeorum*, L., found in a store box containing chiefly "Burnet" and "Cinnabar" moths, which were untouched. He said: "The few sober-coloured noctuid moths in the box were all damaged. Out of curiosity I put the larvae with the damaged moths in this box and put a Burnet moth with them. This was in June 1936. The larvae are now pupating, but though the moths have been in the box since June, the Burnet moth still appears to be untouched."

Mr Hugh Main made a few remarks on the "false-scorpion," *Chelifer latreillii*, Leach.

Mr A. Bliss read a short paper on "Collecting in the Haute Savoie." (See *Trans.*)

22nd APRIL 1937.

The PRESIDENT in the Chair.

Dr E. A. Cockayne exhibited a hitherto unrecorded aberration of *Amphipyra pyramidea*, L. Aberration. ♂. Brompton, Hunts. Bred September 1st, 1925, Raynor. Thorax paler than usual owing to increase of pale scales. The ground colour of the forewings as far out as the sagittate marks, which lie just internal to the subterminal line, is very pale ochreous brown. The light transverse lines are lost in the ground colour. The antemedian line is represented by three blackish-brown dots, the postmedian by a row of blackish dots, and the orbicular by a black dot. The discoidal spot and the dark streak running out from it to the postmedian is of the usual black-brown colour and is most conspicuous. Though its ground colour is much lighter it bears a resemblance to *A. monolitha*, Guen., ab. *strigata*, Warren, figured in Seitz, 38 b.



Photo. A. W. Dennis.

ABERRATIONS OF *AMPHIPYRA PYRAMIDEA*, L.



He also exhibited *Miana versicolor*, Bkh., and said:—Heydemann in 1932 showed that *versicolor* is a species distinct from both *strigilis*, Clrck., and *latruncula*, Schiff. The median area is reddish brown, sometimes almost claret coloured, the two pale yellowish stigmata stand out very clearly and as a rule have a white and a thin black outer edge. Neither of the other species have any red tint in the median area; in *strigilis* the stigmata are of the same colour as the ground and are never paler, and in *latruncula* they never have a white line round them.

Wolff gives good figures of the imagines and genitalia of all three species. The genitalia of *versicolor* are more like those of *strigilis* than *latruncula*, but show many minor differences. The difference most easily recognised is in the oedaeagus, which in *versicolor* has only two spines, whereas in both the others it has three.

J. W. Heslop Harrison records the capture of three specimens of *versicolor* in the Inner Hebrides in 1935-36, so that it is likely to be discovered in other parts of Scotland and probably in England too.

“Harrison: The Natural History of the Isle of Raasay and the adjacent Islands of South Rona, Scalpay, Fladday, and Longay.” “Proc. Univ. Durham Philosoph. Soc.,” X., 313. Wolff: “Ent. Meddel,” 1935, XIX., H. 5 and 6.

Mr M. Niblett exhibited the Cynipid *Callirhytis glandium*, Gir., bred from galled acorns of the Turkey Oak, *Quercus cerris*, L., after being nearly eight years in the larval state.

Mr D. W. Royffe exhibited living specimens of *Carabus nemoralis*, Müll., from High Wycombe, Bucks.

Mr Stephens exhibited the following Coleoptera from the Chatham district:—*Pentarthrum huttoni*, Woll., January 1, 1937, silk stockings; *Olophrum piceum*, Gyll., March, 1937, plentiful, dried grass; *Scaphidema metallicum*, Fb., March 29, 1937 (4 taken), rare, oak twigs, dead; *Tetratoma ancora*, Fb., April 5, 1937 (9 taken), very rare, rubbish cuttings; *Alphitophagus 4-pustulatus*, Stph., March 4, 1937 (14 taken), plentiful, considered rare, hedge cuttings; *Neuraphes sparshalli*, Den., March 26, 1937, rare (2), moss; *Liosoma oblongulum*, Boh., April 12, 1937, rare (1), from Dog Violet; *Homaloptia ruricola*, Fb., our rarest Lamellicorn, June 26, 1936, on potato haulm; *Antherophagus silaceus*, Hrbst, the larva of which lives in *Bombus* nests.

Mr A. Bliss exhibited larvae of *Campaea* (*Metrocampia*) *margaritata*, L.

Mr Wallis Norton exhibited some Lepidoptera, which had been killed with petrol, and made some remarks on the process.

Mr R. W. Attwood exhibited a pupa of *Nonagria geminipuncta*, Hatch., in a reed stem, from South Benfleet, Essex.

The President exhibited a large number of elytra of Coleoptera obtained from pellets of the Little Owl. Many of them had been identified.

Dr C. G. M. de Worms exhibited a remarkable aberration of *Cidaria* (*Entephria*) *caesiata*, Schiff., taken by Mr A. Mackworth-Praed

in N.E. Perthshire (2500 ft.), 15th August, 1936. This was subsequently identified by Dr Cockayne as ab. *paradoxa*, Lange, described in *Iris*, 1921, vol. XXXV., p. 165, figs. 1-3. It is the first example to be recorded in this country. It was described from three specimens taken near Freiburg (Germany). See "Entomologist," LXX. (1937), p. 196, and pl. IV., fig. 8, "Iris," XXXV., 1921, p. 165, figs. 1-5.

Mr Coulson then read "Remarks on the British Clavicornia (Col.)," which he illustrated with a large number of specimens. (See *Trans.*)

13th MAY 1937.

The PRESIDENT in the Chair.

Mr Niblett exhibited the following gall wasps:—*Diplolepis taschenbergi*, Schlt., and its gall on oak, with the alternate generation *D. quercusfolia*, Linn., and its gall; *D. similis*, Adlr., and its gall on oak with its alternate generation *D. longiventris*, Htg., and its gall; also *Pontania pedunculi*, Schn., and its gall on oak.

Mr Dennis exhibited a gall on willow, caused by the Dipteron, *Rhabdophaga rosaria*, Lw. (Cecid.).

Mr Hawkins exhibited a bushy gall on heather and also stems of heather from which the bark had been eaten (presumably by some insect) in such a way as to kill the portion of the plant above the ring.

Mr Eagles exhibited the larvae of a species of Thysanoptera found on decaying wood.

27th MAY 1937.

The PRESIDENT in the Chair.

Mr H. W. Andrews exhibited a specimen of the very rare British Dipteron, *Volucella zonaria*, Poda, from a box of Diptera taken by the late Curator, Mr W. West, and probably of British origin. *V. inanis*, L., a more common species, was also shown. The larvae of both are found in the nests of the Common Wasp.

Dr H. B. Williams exhibited an aberration of *Hemerophila abruptaria*, Thnbg., very dark blackish brown with a very small amount of light marking, a form of either ab. *brunneata*, Tutt, or of ab. *fuscata*, Tutt.

Dr E. A. Cockayne read a short paper dealing with the variation occurring in *Gonodontis bidentata*, Clerck, and exhibited a long series with many striking aberrations and racial forms. Other members also brought up their series, and a short discussion ensued. (See *Trans.*)

Mr Wallis Norton exhibited a yellow form of *Pieris napi*, L., from Ireland.

Dr C. G. M. de Worms reported on a recent visit to Scotland.

On behalf of Dr Robertson, Mr S. Wakely exhibited:—(a) A remarkable aberration of *Epione repandaria*, Hüfn. (*apiciaria*, Schiff.),

in which the dark border ran into the costa in a similar manner to that of *E. vespertaria*, Fb. (*parallellaria*, Schiff.). This specimen had been recorded as a Sussex example of the latter moth some years ago. (b) A pale specimen of *Anaitis* (*Eucestis*) *plagiata*, L., with markings indistinct. (c) A specimen of *Cosmia* (*Orthosia*) *lutea*, Strom. (*flavago*, Fb.), v. *flavescens*, Esp., with the reniform stigma hardly discernible. All taken in Sussex.

Mr Wakely also exhibited larvae of *Endrosa* (*Setina*) *irrorella*, Clrck., taken on Freshwater Down at Whitsun.

Mr Eagles exhibited parasites from cocoons found on a larva of *Thera obeliscata*, Hb., and young larvae of *Panolis piniperda*, Panz., from Oxshott.

Mr Harris exhibited larvae of *Thecla pruni*, L.

Mr C. N. Hawkins reported *Vanessa cardui*, L., from Eastbourne.

10th JUNE 1937.

The PRESIDENT in the Chair.

The deaths of two members were reported—Mr James H. Rowntree, of Scarborough, and Mr H. W. Walker, of Potters Bar.

Mr C. N. Hawkins exhibited larvae of *Aglais urticae*, L., and of *Amathes lychnidis*, Schiff. (*pistacina*, Fb.).

Dr H. B. Williams exhibited a series of colour sports of *Helianthemum* between red and yellow varieties.

Mr Wallis Norton exhibited larvae of *Euchloris smaragdaria*, Fb., from Benfleet.

Dr Blair exhibited living larvae of *Pararge aegeria*, L., and of *Ortholitha bipunctaria*, Schiff.

Mr Ensor exhibited ova of *Dasychira pudibunda*, L.

Mr D. G. Sevastopulo exhibited a box of Indian lepidopterous larvae and pupae and demonstrated how opalescent colouring could be preserved by the use of corrosive sublimate solution in alcohol, diluted with its own bulk of water.

Rhopalocera:—*Chilasa clytia*, L., mature and immature larva and pupa; *Papilio polytes*, L., f. *romulus*, Cr., pupa; *Papilio demoleus*, L., pupa; *Pieris canidia*, Sparr., f. *indica*, Evans, three pupae; *Terias blanda*, Bsd., f. *silhetana*, Wall., larva; *Terias hecabe*, L., larva; *Danais limniace*, Cr., f. *mutina*, Fruhs., larva and pupa; *Euploea core*, Cr., two pupae in corrosive sublimate solution; *Euthalia garuda*, Mre., f. *suddhodana*, Fruhs., pupa; *Pyrameis indica*, Hbst., larva; *Vanessa cashmirensis*, Koll., f. *asis*, Fruhs., two larvae and pupae; *Lampides boeticus*, L., larva and pupa; *Pratapa deva*, Mre., f. *lila*, Mre., pupa; *Suastus gremius*, F., larva.

Heterocera:—*Aganais ficus*, F., larva; *Argina argus*, Koll., larva; *Lymantria ampla*, Wlk., larva; *Perina nuda*, F., pupa; *Porthesia scintillans*, Wlk., larva; *Theretra oldenlandiae*, F., immature larva and

pupa; *Rhyncholaba acteus*, Cr., immature larva and pupa; *Parasa lepida*, Cr., two cocoons; *Thyatira batis*, L., two larvae; *Sphetta apicalis*, Wlk., larva; *Polytela gloriosae*, F., two larvae; *Prodenia litura*, F., larva; *Chloridea obsoleta*, F., ten larvae; *Capotena truncata*, Wlk., cocoon; *Ophiusa coronata*, F., larva and pupa; *Percnia ductaria*, Wlk., larva and two pupae.

Mr T. R. Eagles exhibited parasitized ova of *Orgyia antiqua*, L., and larvae of *Thera firmata*, Hb.; *Lygris testata*, L.; *Biston strataria*, Hufn.; and *Amathes helvola*, L. (*rufina*, L.).

Mr Jacobs exhibited larvae of the local Phycitid moth, *Nephopteryx genistella*, Dup., together with an imago of the species. The larvae live in the very close growths of furze on the cliff slopes, spinning the shoots together in a loose web-mass within which they live in more closely woven silken tubes, in which, more strongly reinforced with silk, they pupate. The best method of taking the larvae is to cut off the large shoot containing the web, low down on the branch, and then to pull it to pieces over a cloth so that the larvae cannot escape by dropping out of the bottom ends of their tubes. In cutting the branch, it is necessary to exercise extreme care to cause no undue vibration, or the larvae will drop into the bush from their tubes and be lost. Any number of larvae from one to four or five may be found in one web.

The Curator, Mr S. R. Ashby, exhibited the following species of Palaearctic Rhopalocera which had been presented by the British Museum to the Society from the collection of the late Rev. E. Ashby. *Parnassius mnemosyne*, L., r. *dinianus*, Fruh.; *Pieris ergane*, Hb.; *Euchloë belemia*, Esp., f. *glauce*, Hb.; *E. belia*, Cr., f. *ausonia*, Hb., and f. *simplonia*, Frr.; *E. rondoui*, Obthr.; *E. tagis*, Hb., f. *bellizina*, Bdv., and f. *insularis*, Stdgr.; *Erebia scipio*, Bdv.; *E. gavarnica*, Obthr.; *E. epistygne*, Hb.; *E. duponcheli*, Obthr.; *Satyrus hermione*, L.; *S. fidia*, L.; *Pararge roxelana*, Cr.; *P. megera*, L., f. *tigelius*, Bon.; *Argynnis laodice*, Pall.; *Callophrys avis*, Chap.; *Thecla (Zephyrus) quercus*, L.; *T.(Z.) betulae*, L.; *Chrysophanus thersamon*, Esp.; *C. dispar*, L., f. *rutilus*, Wernb., and f. *radiata*, Obthr.; *C. hippothoë*, L., f. *confluens*, Gerh.; *C. amphidamas*, Esp.; *Lycæna donzelii*, Bdv.; *L. admetus*, Esp.; *L. dolus*, Hb.; *L. damone*, Ev.

24th JUNE 1937.

The PRESIDENT in the Chair.

Mr T. R. Eagles exhibited the beetle *Nacerda (Anoncodes) melanura*, L., taken in Drury Lane, and the "Rose Chafer" beetles, *Cetonia aurata*, L., from Loughton, Essex. Also larvae of the moths *Coenoteaphria derivata*, Schiff., and *Earophila badiata*, Schiff., bred from larvae found on rose at Hoddesdon.

Mr Hy. J. Turner exhibited the blue form of the ♀ of the South Brazilian *Morpho aega*, Hb., of which he had previously exhibited the brilliant ♂ and the sombre brown ♀.

Mr R. W. Attwood exhibited the large sawfly, *Sirex gigas*, L., found settled on a bunch of carrots in a shop at Wallingford, Berks, 17.vi.37; also a portion of a web taken from a small crab apple bush, Ashted, Surrey, 12.vi.37; this bush was covered with the web, and contained hundreds of black and white pupae with a few parasitic cocoons. The imagines began to emerge 23.vi.37. This species was subsequently determined as *Scythropia crataegella*, L.

Mr Priest reported *Vanessa cardui*, L., from the Isle of Wight, 31.v.37.

Dr K. G. Blair exhibited a living larva of *Psilura monacha*, L., and drew attention to a pair of glands (?) on each of the first four abdominal segments in addition to the large median gland on the sixth and seventh segments; also a blown larva of *Leucoma salicis*, L., showing a pair of slender processes (glands?) on the first two abdominal segments (Klemensiewicz, 1882). He also exhibited specimens of the midge, *Atrichopogon meloësugans*, Kieff., found in South Devon sucking the blood of *Meloë* beetles (a new record for Britain). and read a note on midges sucking the blood of other insects.

Mr W. H. A. Harris exhibited the following species and read notes upon his exhibit:—*Ectropis punctulata*, Schiff. (*Tephronia punctularia*, Hb.), a rather curious banded form from Brentwood and a typical specimen for comparison. ♂ *Selenia bilunaria*, Esp., taken on the wing at the Effingham Field Meeting, the right hind wing being undeveloped, but no sign of this was apparent in the flight. A short series of *Bapta distinctata*, H.-S. (*Aleucis pictaria*, Curt.), from Effingham and the New Forest—it will be seen that in all cases the markings are more pronounced in those from the New Forest, as against a general grey-ness in the Effingham form. A ♀ *Colias croceus*, Fourc., bred from a ♀ also shown, which was naturally rather damaged, having flown about in the breeding cage. The pupa of the former was attached to the cage by a silk girdle, as is usual, but for some reason or other this was broken. The deformed right antennae and the pale central spot on the middle of the right hind wing might have been a consequence of the pupa having been suspended head downwards.

8th JULY 1937.

Mr F. STANLEY-SMITH, F.R.E.S., VICE-PRESIDENT, in the Chair.

Mr S. N. A. Jacobs exhibited imagines of *Hyponomeuta rorellus*, Hb., from Beccles, Suffolk, presented by the British Museum for the Society's collection. This insect has of recent years multiplied to such an extent as to constitute something of a pest on the *Salix alba*, L. Also specimens of *Cosmopteryx eximia*, Hw., from Bexley, for the Society's collection.

Mr Attwood exhibited a leaf of honeysuckle showing the curious manner in which the larva of *Hemaris fuciformis*, L., had attacked it.

Dr K. G. Blair exhibited a pupa of *Pararge aegeria*, L., in which the colour pattern of the imago could be seen partly developed. The main constituents of this were a number of black spots, which, except for the intensely black eye-spot, at first sight appeared to have no relation to the mature pattern; but the pale areas between them could be seen in parts to have a pinkish hue, and these pinkish spots corresponded with the pale spots of the adult. It then became evident that the black spots, by enlargement and coalescence, would combine to form the dark background of the wing of the adult. This suggests that the primitive pattern in the evolution of this species may have been one of dark spots on a pale ground, and it would be interesting to know if there is any allied species in which such a pattern persists.

Mr H. W. Andrews exhibited series of two species of *Trypetidae* (Dip.) viz.. *Euribia spoliata*, Hal., and *Trypeta* (*Orellia*) *vectensis*, Collin, bred in July 1937 from seed-heads taken in 1935 and from which a series of each species had already been bred in 1936, and pointed out how advantageous it was to a species to be able to delay emergence or development during an unfavourable season.

Mr T. R. Eagles exhibited larvae of *Notodonta ziczac*, L., reared from ova found on sallow at Hoddesdon, Herts. About a dozen ova were found on one small sallow bush scarcely two feet high. Also larvae of the common pug, *Eupithecia vulgata*, Haw.

Dr Bull exhibited a curious object on an aspen leaf, very beautifully anchored down by innumerable threads arranged radiating from the top. It was suggested that it was probably a spider's egg cocoon.

The Chairman announced that he understod that four examples of the very rare *Aplasta ononaria*, Fuessl., had been taken in Kent.

Reports of the Field Meetings were then read by the leaders:—Bookham Common, 17.iv.; Westerham, 8.v.; Abrook and Esher Commons, 15.v.; Isle of Wight, 30.v.; Ashtead, 12.vi.; Forest Row, 4.vii.

22nd JULY, 1937.

The PRESIDENT in the Chair.

The death of Mr R. A. Adkin, the only son of the late Mr Robert Adkin, was announced.

Mr Sevastopulo exhibited insects embedded in a semi-fossil gum (resin) from E. Africa, and wings of Lepidoptera mounted under cellophane, and pointed out that such would be of great use to collectors abroad to identify captured specimens.

Dr H. B. Williams exhibited a short series of *Boarmia rhomboidaria*, Schiff., including the Scotch form, *haggarti*, Williams, a remarkable light race which occurs on the Ayrshire coast.

Mr F. D. Coote exhibited ova of *Melitaea athalia*, Rott., from a ♀ captured at Hadleigh Wood during the Field Meeting on 10th July. Also very large oak leaves from the Field Meeting at Seal Chart, on

which, it was pointed out, were examples of very young button galls caused by one of the gall-wasps. He also showed a breeding-cage made from old used photo plates, adapted from Mr Brett's model, shown some time ago.

Mr R. J. Collins gave the following report of his holiday in June 1937:—

As last year, Miss Muller and I again visited the Shetland Islands. Unfortunately the glorious weather of our last visit was not repeated, and we experienced rain, cold and gales, all which, of course, considerably curtailed our collecting.

During the voyage the ship called in for a few hours at Stromness, on the Orkneys, and we went ashore from about 10.30 p.m. to midnight. During this time we took one typical *Cidaria ocellata*, L., five *Cidaria montanata*, Schiff., which show a graduation of the central bar from a dark brown to ab. *albicans*, Strand, and one *C. munitata*, Hb.

At the Shetlands the weather, as I have said, precluded much collecting. However, we took six *C. albulata*, Schiff., and a dozen *Eupithecia satyrata*, Hb., f. *curzoni*, Grgs., and several specimens of *Eudoria* (*Scoparia*) *frequentella*, Stt. The bee, *Bombus smithianus*, White, which I brought back last year appeared to be interesting, so I obtained a dozen this time. The two *Hepialus humuli*, L. were taken at rest; but the greatest slice of luck (I can describe it in no other way) was when, at 10.5 p.m. (s.t.) I discovered a paired ♂ and ♀ *H. fusconebulosa*, D.G. (*velleda*, Hb.). I removed the ♂, and from then until 10.30 p.m., in spite of a cold misty rain, I obtained fifty-six ♂♂ which answered the call of the one crippled ♀.

A few larvae of *Simaethis pariana*, Clrck., that we obtained from nettle obligingly spun up the next day, and four emerged on the 19th July, one being a cripple.

Mr C. N. Hawkins exhibited:—

(1) A larva of *Drymonia trimacula*, Esp., and pointed out how it differed from the larva of *D. chaonia*, Hb., particularly in colour, in the absence of a white or cream-coloured medio-dorsal line and in the presence of a crimson upper edge to the spiracular stripe.

(2) Larvae of *Anagoga* (*Numeria*) *pulveraria*, L., bred ab ovo. Ova laid 29/30.v.1937. Hatched 7.vi.37. Larvae began to go down for pupation 18.vii.37.

(3) A series of 17 unselected specimens of *Thera obeliscata*, Hb., bred from wild larvae collected at Ockham Common in April 1937. Of these 3 were almost entirely dull brown with just a faint trace of a central chestnut-coloured band and shoulder patch, while the remaining 14 were all more or less well-marked specimens with good cross-bands and lines, though both bands and ground-colour varied (independently) from pale brown or grey-brown to dark brown.

(4) A specimen of *Anarta myrtili*, L., taken at Ockham Common on 30.iv.1937 having a complete white band extending from the costa to the inner margin of each fore wing and including the white discal spot,

Another less extreme specimen taken at Oxshott on 3.v.37, in which the band stops short of the inner margin. A normal specimen for comparison.

Mr Coulson exhibited an example of the heath form of *Gnophos obscurata*, Schiff., and a series of *Otiorrhyncus ovatus*, L. (Col.), received from Mr B. W. Adkin. A nursery near Reading was said to have suffered severely from the attacks of this pest, which the owners had endeavoured to check by burning all rubbish, etc. Finally the nursery had been completely cleared in the attempt to exterminate the beetles.

Mr A. Bliss exhibited the larvae of *Ennomos quercinaria*, Huf., from Forest Row.

Mr T. R. Eagles exhibited larvae of *Choerocampa* (*Metopsilus*) (*Theretra*) *porcellus*, L., and galls on *Galium* caused by *Cecidomyia galii*, Lw. (Dip.) = (*Perrisia galii*, Lw.).

Mr Hugh Main exhibited some living specimens he had recently brought back from a visit to Canada and the United States. In Toronto he obtained some Hellgrammites, the larvae of *Corydalis cornutus*, L., whose life-history is very similar to that of our *Sialis*. They were being sold to fishermen for bait for Bass. A Jerusalem Cricket, *Stenopelmatus pictus*, found in Yosemite Valley, was a very curious-looking insect. It is an active tunneller underground and from the quaint appearance of its head at the entrance to its shaft it gets its common names "Baby-face" and "Infant of the Earth." He also showed a Black Widow Spider, *Latrodectus mactans*, L., with its egg-cocoon, from Sacramento. This spider is found in outbuildings such as stables, sheds, etc., and its bite is stated to be very dangerous, and often fatal to man.

Dr G. V. Bull exhibited the results of an experiment on the inbreeding of *Diacrisia* (*Spilosoma*) *lutea*, Hufn. (*lubricipeda*, L.). The stock died out after four inbred generations. Half of the 4th generation were more or less crippled though of average size. Pairings resulted but most of the ova were laid loose instead of adherent to the box, and though the ova changed colour slightly no larvae hatched.

Mr Ensor exhibited specimens of *Anobium striatum*, Ol. (*domesticum*, Frery.) (Col.).

12th AUGUST 1937.

The PRESIDENT in the Chair.

Mr Dennis exhibited a photograph of the ova of *Melitaea athalia*, L., from a batch obtained by Mr Coote.

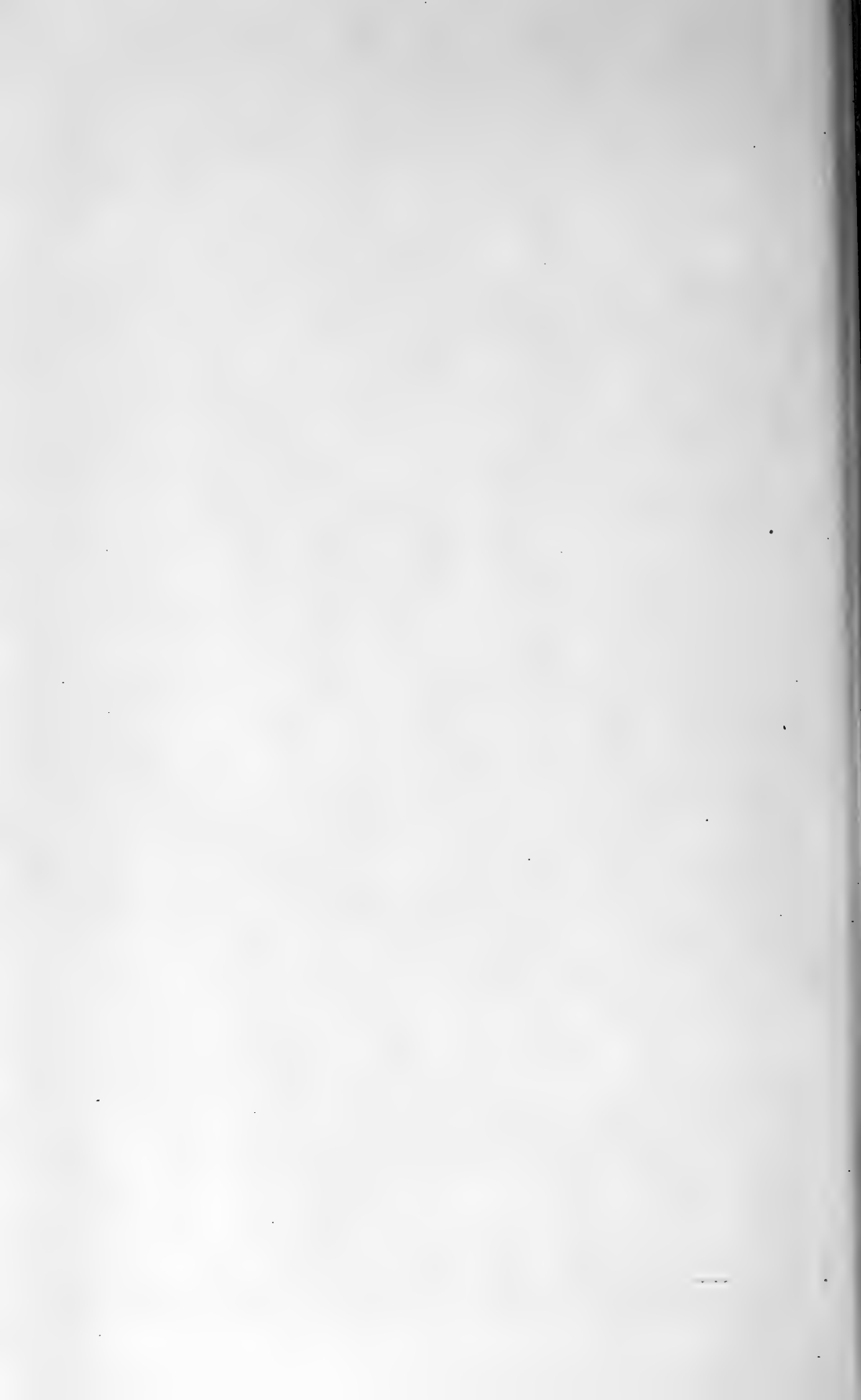
Mr Eagles exhibited the full-grown larva of *Choerocampa* (*Theretra*) (*Metopsilus*) *porcellus*, L., and larvae of *Calostigia pectinitaria*, Knoch, and of *Ptychopoda seriata*, Schrnk. (*virgularia*, Hb.) (*incanata*, Schiff.).

Dr C. M. G. de Worms made remarks on his recent collecting trip.



Photo. A. W. Dennis.

OVA OF MELITAEA ATHALIA, ROTT.



Mr H. W. Andrews exhibited the Diptera, *Pachygaster atra*, Panz., and *P. leachii*, Curt., taken in N. Kent.

Mr C. N. Hawkins exhibited bred examples of *Acronicta alni*, L., and *A. ligustri*, Fb.

Mr Hy. J. Turner exhibited a few species of Rhopalocera just recently received from his correspondent near Baños on the Eastern slopes of the Andes in Ecuador. They included seven species of *Hesperiidae* or *Grypocera*, as the modern systematists name this major group. He pointed out that the Neotropical Region was very rich in species of this group, especially so the Southern half.

Mr G. A. Brett exhibited ova and a cocoon of *Cossus cossus*, Fb., made by a full-grown larva found last autumn. The larva pupated in soil and the imago emerged on 6.vii.37. It was not killed until two days later, and in that time it laid about 90 ova, of course not fertile. A few of these were on the surface of the soil, but they were mostly about $\frac{1}{2}$ inch below the surface. Presumably they were deposited there by means of the long ovipositor. They were mostly laid in small bunches containing from 3 to about 12 ova.

Dr E. A. Cockayne exhibited a brown form of the larva of *Collix sparsata*, Hb., and said that out of more than fifty larvae of *Collix sparsata* beaten from *Lysimachia vulgaris*, L., at the field meeting at Byfleet two became brown in the last instar, and Mr C. N. Hawkins tells me that one of his also turned brown. This form is not mentioned by Buckler, Barrett, South, Newman, or Wilson, nor do any of these authors record Surrey as a locality. There is, however, a Surrey record in one of the periodicals. In the living larva the green blood and intestinal contents show through the pale brown skin of the brown form. The head is slightly darker brown than in the green form; the legs are pale pinkish brown. The whole of the dorsal surface is pale brown with the usual lines of a darker tint, and there is a still darker brown stripe, widest at the middle of each somite, situated just above the white spiracular stripe. The whole of the ventral surface is uniformly pale pinkish brown. The outer aspect of the first pair of prolegs is dark pink, but the anal prolegs are green.

26th AUGUST 1937.

The PRESIDENT in the Chair.

Dr Cockayne exhibited a form of *Scopula (Acidalia) ternata*, Schrnk. (*fumata*, Steph.), with strongly marked lines; also *Semiothisa notata*, L., both from Kinlochewe.

Mr Coote exhibited larvae of *Melitaea athalia*, Rott., from the Hadleigh Wood area, Essex.

Dr H. B. Williams exhibited an extremely pale specimen of *Smerinthus ocellatus*, L.

Mr Attwood exhibited a gynandromorphic specimen of *Boarmia punctinalis*, Scop. (*consortaria*, Hb.), taken at the Society's Field Meeting at Ashted on 12th June. Right wing ♂, left wing ♀.

Mr Hy. J. Turner exhibited forms of *Rhyacia* = *Epipsilia* (*Agrotis*) *hyperborea*, Zett. (1) An extremely dark example of the Shetland race. (2) An extremely light form of the Rannoch race.

Mr D. G. Sevastopulo exhibited Indian examples of the following British species of Heterocera:—*Herse convolvuli*, L., and ssp. *orientalis*, Btlr., *Deilephila nerii*, L., *Celerio lineata*, F. (*livornica*, Esp.), *Pergesa elpenor*, L. (*macromera*, Btlr.), *Hippotion celerio*, L., *Habrosyne derasa*, L. (*indica*, Moore), *Thyatira batis*, L., *Utetheisa pulchella*, L., *Euxoa segetum*, Schiff., *Rhyacia ypsilon*, Rott., *Rhyacia c-nigrum*, L., *Rhyacia putris*, L., *Sideridis unipuncta*, Haw., *Chloridea obsoleta*, F. (*armigera*, Hb.), *Tarache lucida*, Hufn., *Hypena proboscidalis*, L., *Rhodometra sacraria*, L., *Euphyia silaceata*, Schiff., *Dysstroma citrata*, L., *Abraxas sylvata*, Scop. (*leopardina*, Koll.). In some cases the Indian form is of a distinct sub-species.

Dr K. G. Blair exhibited two species of N. American Hemiptera that have recently established themselves in this country on Rhododendrons, viz.:—*Stephanitis rhododendri*, Horv., a Tingid first noticed at Fulham (Distant, *Zoologist*, 1910, p. 395) and now fairly widely distributed in Surrey. According to Champion ("Ent. Mo. Mag.," 1916) it is found abundantly on mountain laurel (*Kalmia latifolia*) and *Rhododendron maximum* in the Atlantic States and westward to Ohio; and *Graphocephala coccinea*, Forst., a Jassid, of which the first British mention is by China, "Ent. Mo. Mag.," 1935, p. 277. This was found by Mr L. Barton at Chobham, where it is still abundant and whence it has spread to Weybridge. It also is distributed over the eastern half of the United States, where it feeds on a great variety of weeds and grasses and also numerous shrubs and trees. With us it appears so far to have confined its attacks to rhododendrons.

Also a batch of eggs of the Buff-tip Moth, on an oak leaf from his garden at Hendon, that was remarkable for the regular way in which the eggs were spaced instead of being close together as usual. The eggs had all been parasitised by the Scelionid, *Telenomus punctatissimus*, Ratz., of which the flies emerged in August. *Trichogramma vitripennis*, Walk., a Chalcid parasite of the same species of eggs, was also shown. It was suggested that the spacing of the eggs was due to their having been laid on a leaf before it was fully expanded.

Mr S. Wakely exhibited about fifty species of Lepidoptera taken at Field Meetings during the current season, including:—*Tinea arcella*, Fabr. (Westerham); *Oecophora geoffrella*, L. (Broadwater Forest); *Pyrausta verbascalis*, Schiff., *Oxyptilus parvidactyla*, Haw., *Pempelia dilutella*, Hübn., *Cedestis gysseleniella*, Dup., and *Coleophora lixella*, Zell. (Boxhill); *Hypena costistrigalis*, Steph., *Ancylis siculana*, Hübn., and *Batrachedra pinicolella*, Dup. (Ashdown Forest); *Phalonia vectisana*, Westw., and *Eucosma citrana*, Hübn. (Benfleet); *Crambus uliginosellus*,

Zell., *Evergestis straminealis*, Hübn., and *Choreutis myllerana*, Fabr. (Byfleet). A species of *Lepisma*, taken at Finsbury, was also shown, and it was suggested it was an introduced species. This was subsequently identified as the "fire-brat," *Thermobia furnorum*, L.

Mr Ensor exhibited an example of the larva of *Dasychira pudibunda*, L., which was of very dark coloration with no red tail tuft; also a natural assemblage on a single leaf of 25 pupae of a Coccinellid.

Mr Hawkins exhibited an example of the red form of the larva of *Sphinx ligustri*, L., resembling the figure in Buckler's "Larvae" but more extreme. It was from Oxfordshire, and was found on privet by Mr Lewis Rudland.

Mr Harris exhibited a specimen of the rare local Homopteron (Rhynchota) *Ledra aurita*, L., from Chiddingfold.

It was reported that *Colias croceus*, Frcry., was plentiful at Folkestone; that *Polyommatus bellargus*, Rott., was scarce in June and that it had not appeared as a second brood in the early part of August; that *Crambus hamellus*, Thunb., was plentiful on Blackheath, Chilworth, where it was discovered last autumn; that *Polygonia c-album*, L., had appeared in Brixton; and that *Vanessa cardui*, L., was fairly common in a few localities.

Mr August exhibited a larva of *Sciona (Scoria) lineata*, Scop. (*dealbata*, L.), from Sussex.

Preliminary reports of the Field Meetings held at Benfleet, Byfleet and Seal Chart were communicated by the respective leaders.

9th SEPTEMBER 1937.

The PRESIDENT in the Chair.

Dr H. B. Williams exhibited a large number of Irish Lepidoptera with English representatives for comparison to illustrate his paper subsequently read.

Dr Cockayne exhibited a larva of *Mamestra albicolon*, Hb.

Mr Eagles exhibited a larva of *Hadena (Mamestra) trifolii*, Rott., and of *Eupithecia subnotata*, Hb., found abundantly on *Chenopodium* growing on rough ground. Also the egg capsule of *Blatta orientalis*, L.

Mr Jacobs exhibited the Dipteron, *Sepsis punctum*, Fb., taken in Ashdown Forest at Forest Row. These insects, as is their habit, were in a dense swarm so that the vegetation over a rough circle some six feet in diameter was black with them. This was on the 29th August.

Mr S. Wakely exhibited a specimen of *Myelois ceratoniae*, Zeller, bred on 29th June 1937 from a larva found feeding in a Spanish orange, this species usually being found among imported dried dates, or ceratonia beans. Also a specimen of *Stigmella (Nepticula) suberivora*, Stainton, bred on 2nd September 1937 from mined leaves of *Quercus ilex*, gathered at Freshwater, Isle of Wight, during August. This species had been considered as single-brooded, the imagines occurring in May. On behalf of Mr W. L. Rudland, larvae of *Hyponomeuta vigintipunc-*

tata, Retz., from Mapledurham, Oxfordshire; and on behalf of Mr G. H. Cornish a larva of the local *Bedellia somnulentella*, Zeller, from Plumstead, Kent.

23rd SEPTEMBER 1937.

The PRESIDENT in the Chair.

Mr Coote exhibited a larva of *Atolmis* (*Gnophria*) *rubricollis*, L., feeding on an alga growing on a dead pine twig in the New Forest.

Mr E. W. Classey exhibited the larvae of *Sterrha* (*Ptychopoda*) *degeneraria*, Hb., from Portland, and of *S. (P.) aversata*, L., from Surrey, and pointed out the differences between the larvae of these two closely related species.

Mr Musgrave exhibited larvae and adults of the Dipteron *Tipula* sp. ? (probably *flavolineata*, Mg.) from rotting timber in a wood near Ellesborough, Bucks.

Mr H. Moore exhibited a larva of *Crambus parallellus*, taken at Eynsford, 15.viii.37, and noted that the larva was still alive without feeding, though greatly reduced in bulk; it was not, however, making any attempt at pupation.

Mr S. Wakely exhibited larvae and cases of *Coleophora therinella*, Tngstr., feeding on field thistles, from Norwood; of *Coleophora paripennella*, Zell., found by Mr G. H. Cornish at Plumstead.

Mr Attwood exhibited larvae of *Euchloris smaragdaria*, Fb., from S. Benfleet; of *Anarta* (*Melanchra*) *myrtili*, L., from Westerham, of *Noto-donta dromedarius*, L., from N. Benfleet, and *Lophopteryx carmelita*, L., from Epping Forest.

Dr Bull exhibited larvae of *Gonodontis bidentata*, Clrck., and of a *Eupithecia* sp., also the remains of larvae of *N. dromedarius*, L., containing a parasite in the tail. The parasite, he said, seems to enter at the head, suck the body dry, and pupate at the tail. Also the ladybird, *Halysia 16-guttata*, L., bred from Aviemore.

Dr H. B. Williams exhibited larvae of *Pygaera curtula*, L., from Horndean, Hants., 10.ix.37.

Mr T. R. Eagles exhibited the Hairy Porcelain Crab, *Porcellana platycheles*, Leach., and the fossil Mollusca, *Pholas dactylus*, L., and *Striatella arctica*, L., from chalk blocks at Broadstairs.

Dr Bull read a short paper, "A Week at Aviemore in September." (See Trans.)

14th OCTOBER 1937.

The PRESIDENT in the Chair.

The President exhibited a specimen of the weevil, *Acalyptus carpini*, Hbst. (*rufipennis*, Gyll.), taken by sweeping in a swampy spot by the ponds on Bookham Common, 28.ix.37. No previous record of this species in Surrey exists.

Dr Cockayne exhibited (a) a number of imagines of *Leucania vitellina*, Hb., from S. Devon, with others from Dungeness. He drew attention to the redder colour of the former, and stated that in his experience the red form had always occurred in Devon. He suggested that this indicated that the species must be maintained in this country by breeding. (b) Four forms of *Agrotis saucia*, Hb., and noted the fact that the colour near the costa was always matched by that of the patagia and tegulae.

Mr F. D. Coote exhibited *Mamestra contigua*, Vill., from Byfleet, Surrey, and said "From miscellaneous larvae taken at the Field Meeting at Byfleet on the 12th September last year, I bred on the 14th June this year one *Mamestra contigua*. At the end of last month at Byfleet I beat from birch a larva of the same insect nearly full fed. There is no record in the Society's 'Proceedings' of the occurrence of this moth at Byfleet, so there is one more to add to the large list of the Lepidoptera of that locality."

Mr S. G. Wallis Norton exhibited (1) *Catocala fraxini*, L., taken at "sugar" near Ashford, Kent, 12th September 1937. (2) *Cidaria citrata*, L. (*immanata*, Haw.), Scotch forms, taken during August at Elie, Fifeshire, with typical form for comparison. And (3) *Aricia (Lycaena) agestis*, Hb. (*medon*, Esp.) (*astrarche*, Brgstr.), somewhat aberrant forms taken at Folkestone in early September 1937.

Dr K. G. Blair exhibited living examples in different stages of growth of the stick insect, *Carausius (Dixippus) morosus*, Brunn., and remarked on various points in their life-history.

Mr S. W. C. Williams exhibited larvae of *Demas coryli*, L., from Epping Forest.

Dr Bull exhibited Hymenopterous parasites bred from the ova of *Amorpha populi*, L., given him by Col. Mosse of Tunbridge Wells. They were subsequently identified by Mr Nixon as a *Telenomus* sp.

A series of lantern slides from the collection of the late Robert Adkin were then shown.

28th OCTOBER 1937.

ANNUAL EXHIBITION AND CONVERSAZIONE.

Mr C. D. Anderson exhibited a few Lepidoptera from Inverness.

Mr S. R. Ashby exhibited series of various genera of the British Coleoptera in the Families *Chrysomelidae* and *Lariidae*.

Mr J. L. Atkinson exhibited *Xanthia fulvago*, L., and *X. lutea*, Ström. (*flavago*, Fb.), bred from Kent, 1937.

Mr R. W. Attwood exhibited some of the Lepidoptera he had taken at the Field Meetings of the Society during the year, including *Lithosia griseola*, Hb., *Hylophila bicolorana*, Fuessl., *Acronicta leporina*, L., *Brachionycha sphinx*, Hufn., *Mamestra contigua*, Vill., *Erastria (Haplotis) pygarga*, Hufn. (*fasciana*, L.), *Orgyia gonostigma*, Fb., *Euchloris*

smaragdaria, Fb., *Bapta distinctata*, H.-S. (*Aleucis pictaria*, Curt.), *Aspitates gilvaria*, Schiff., and others.

Mr T. L. Barnett exhibited a varied series of *Plebeius aegon*, Schiff. = *argus*, L., from Kent; a bred series of *Ectropis* (*Tephrosia*) *bistortata*, Göze, Surrey, April 1937; and a second brood of *Parasemia plantaginis*, L., bred from ova, Kirkstone Pass, September-October 1937.

Mr E. S. A. Baynes exhibited the specimen of *Catocala nupta*, L., ab. *brunnescens*, Warr., taken at Esher, August 1935, and recorded "Entomologist," LXIX, 48, 1936.

Mr S. F. P. Blyth exhibited short series of the following species from Contrexeville in the Ardennes Mts.:—*Limenitis populi*, L., *Melitaea maturna*, L., *Coenonympha hero*, L., and one example of *Chrysophanus rutilus*, Wer., taken on the extreme north-west of their area of distribution in Europe.

Mr Percy M. Bright exhibited two cabinet drawers of various forms of *Polyommatus* (*Lysandra*) *coridon*, Poda, as described and illustrated in a "Monograph" on this species, by himself and H. A. Leeds, and now in the press. They were labelled with descriptive terms, suggested as substitutes for inappropriate, non-informative names and for long descriptions. [Published in April 1938.]

Mr F. D. Buck exhibited living ♂ and ♀ examples of the water-beetle, *Dytiscus punctulatus*, Fb., in a small tank of water.

Mr A. A. W. Buckstone exhibited the following series of Lepidoptera:—*Polygonia c-album*, L.—Three very dark, and one very pale with metallic sheen; bred, Surrey, September 1937. Five undersides with abnormal number of green scales; bred, Surrey, September 1937. One very dark upperside, ditto underside, and one extremely pale underside; captured, Ashted, July 1937. Three with row of blue spots on hind wings, Ashted. *Maniola* (*Epinephele*) *jurtina*, L. (*janira*, L.), bleached form, I. of Wight, 1937; *Epirrhoë alternata*, Müll. (*Xanthorhoë sociata*, Bork.), a specimen with cross lines absent, Fetcham, May 1937, and *Polyploca flavicornis*, Haw., from many localities in Surrey, Wales and Scotland.

Dr G. V. Bull exhibited series of typical "intermediate," i.e., ab. *insulana*, Th.-Mg., and the black form, ab. *carbonaria*, Jord., of *Biston betularia*, L., from Herts. and Kent; various butterflies injured by birds; an Ant, *Formica rufa*, L., and its prey, the Dipteron, *Scatophaga stercoraria*, L., taken at light on the sheet at night; and specimens of the second generation of *Hemerophila abruptaria*, Thnbg., bred from a North London melanic ♀, all uniformly darker than the ordinary forms.

Capt. A. Egerton-Collier exhibited a ♀ of *Aphantopus hyperantus*, L., showing extreme colour variation. The specimen, taken 30.viii.37, at Strensall, Yorks, is above and below, of a uniform ochreous.

Mr S. A. Chartres exhibited varieties of British Rhopalocera taken at Royston, etc., including an aberration of *Polyommatus bellargus*, Rott., a ♀ in which the left hindwing had a white edge.

Dr E. A. Cockayne exhibited two ♂♂ of *Ematurga atomaria*, L., with no dark speckling, similar to one shown by him at the Annual Exhibition in 1935; two white males of *Boarmia repandata*, L., ab. *conversaria*, Hb., Ross-shire; *Leucania vitellina*, Hb., from South Devon, including deep red forms.

Mr G. A. Cole exhibited:—Selected specimens of Lepidoptera bred and captured during the 1937 season. Butterflies:—A few *P. (L.) coridon*, Poda, including var. *syngrapha*, H.-S., and *semi-syngrapha*, Tutt, and a few *P. (L.) bellargus*, Rott. Moths:—A selection of "Prominents," including *Lophopteryx carmelita*, Esp., and *L. cuculla*, Esp. Short series of *Leucania turca*, L., from Hants; *Cirrhoedia xerampelina*, Hb., from Bucks, and bred specimens of *Pachnobia leucographa*, Hb., from Herefordshire, and some melanic examples of *Ectropis bistortata*, Göze, including an extraordinary *varleyata*-like ab.

Mr B. H. Crabtree exhibited:—*Nymphalis io*, L.—Bred by W. Austen, Folkestone, 1906. Intense black extending along costa and hind margin of left forewing, virtually eliminating the eyespot. *Argynnis adippe*, L. (*cydippe*, L.)—Intensely suffused with black, Lewes, 1922. *Argynnis aglaia*, L., ab. *molybdene* Newnham—Usual black spots replaced with leaden ones. F. W. Newnham, Church Stretton, 1917. *Aricia agestis*, Schiff. (*medon*, Hufn.)—Fine underside, very white ground colour with well-defined marginal red spots. A. E. Tonge, Royston, 1927.

Mr R. C. R. Crewdson exhibited many of his recent captures, including:—*Crymodes exulis*, Lef.—Seven specimens taken in the Rannoch district, Perthshire, in July and August 1937. *Xylomania (Xylomoges) conspicillaris*, L.—Some specimens bred from a ♀ taken in Somerset in May 1937. *Triphaena comes*, Hb.—About 60 specimens including a large number of the *curtisii*, Newm. form, bred from a ♀ taken near Forres, Morayshire, in August 1936. *Diacrisia lubricipeda*, L. (*Spilosoma menthastri*, Esp.)—A dark cream-coloured example from Ham Street, Kent, a specimen with the forewings almost free from spots from the same locality, and a ♀ with cream-coloured forewings from Kinlochewe, Ross-shire. *Trichiura crataegi*, L.—Some dark examples from Rannoch. *Calocasia cervinalis*, Scop. (*Eucosmia certata*, Hb.) and *Coenotephria (Anticlea) berberata*, Schiff. *Boarmia repandata*, L.—Series from Kinlochewe, Ross-shire, including many *conversaria*, Hb. forms—some dark examples bred from larvae taken at Kinlochewe, Ross-shire. *Chesias rufata*, Fb.—Some specimens from near Forres, Morayshire.

Mr J. C. B. Craske exhibited a large number of aberrations of the "Blues" and "Browns," with a series of *Aglais urticae*, L., selected from 6000 bred from larvae, Co. Cork. There were included *Heodes phlaeas*, L., with orange band on hindwing absent; *Plebeius argus*, L. = *aegon*, Schiff., with bleached markings; *Maniola tithonus*, L., symmetrically coloured with cream on all four wings; another with streaked spots below the apical one.

Mr S. P. Doudney exhibited collections of Lepidoptera taken in the New Forest, Kent, Wales, and Scotland.

Mr H. G. Denvil exhibited the following living reptiles:—Two specimens of the Dice or Tessellated Snake (*Natrix tessellatus*, Laur.). Young specimens of the Elegant Terrapin (*Chrysemys elegans*, Wied.) and Spanish Terrapin (*Clemmys leprosa*, Schweig) and the Carolina Box Tortoise (*Terrapene carolina*, L.).

Mr T. R. Eagles exhibited a selection of Coleoptera of economic importance and of popular interest, including preserved examples of the Colorado beetle.

Mr H. M. Edelsten exhibited the specimen of *Diacrisia lubricipeda*, L. (in part) (*menthastri*, Esp.), "white ermine" (see "Ent.," LXX, 1937, 203, plt. IV, fig. 6); also *Polyplocia* (*Asphalia*) *diluta*, Fb. ab., from Mid Sussex. "The basal area of the forewing is reddish grey; the first band brownish black; the usual greyish central area silver grey. The outer band is not quite so dark as the inner and merges into the outer area of the wing which is of a greyish fuscous. The hindwings are greyish fuscous except the basal area which is whitish grey."

Mr Bernard Embry exhibited the following Lepidoptera:—From East Kent—*Aphantopus hyperantus*, L., ab. *arete*, Müll., *Polyommatus icarus*, Rott., ab. *subobsoleta*, Tutt, *Heodes phlaeas*, L., having a bleached left forewing; *Nola albula*, Hb. (*albulalis*, Hb.) which does not appear to have been recorded from Kent since 1902; *Noctua stigmatica*, Hb., *Leucania vitellina*, Hb., ab. *pallida*, Warr.-Seitz, *Caradrina exigua*, Hb., *Ematurga atomaria*, L., gynandromorph, left side ♂, right side ♀; *Pionea margaritalis*, Schiff. (*extimalis*, Scop.), *Stenia punctalis*, Schiff., *Salebria obductella*, F., *Collix sparsata*, Fues. From Ashdown Forest—*Noctua ditrapezium*, Bkh., *Synanthedon sphecoformis*, Schiff. From W. Suffolk—*Cosmia* (*Mellinia*) *ocellaris*, Bkh. From Huntingdonshire—*Cymatophora ocularis*, Gn. (*octogessima*, Hb.), having forewings of a chocolate-brown colour and hindwings darker than those in normal specimens; there is a similar specimen in the Banks' Collection at the British Museum (N.H.); *Tapinostola concolor*, Gn. (*extrema*, Hb.), *T. hellmanni*, Ev., larger and darker than Wicken specimens; *Euphyia* (*Anticlea*) *rubidata*, Schiff.

Mr F. W. Frohawk exhibited five *Gonepteryx rhamni*, L.—♂ rose-pink margins, captured; ♂ heavily clouded with crimson and pearly-pink, captured; ♂ ♀ bred by F.W.F., margined with black; ♀ underside ochreous-buff. One *Colias croceus*, Frcry., ab. *pallida-obsoleta*, Tutt—Captured by F.W.F. Two *Aglais urticae*, L.—♀ pale-buff, and ♀ ab. *nigra*, Tutt (extreme form), both captured, one by Capt. E. B. Purefoy (*nigra*). Two *Polygonia c-album*, L. abs. Three *Limenitis camilla*, L. (*sibilla*, L.). Two *semi-nigrina*, Tutt, captured by Miss Frohawk, and *nigrina*, Weym., captured by F.W.F. Two *Vanessa cardui*, L., captured by F.W.F.—♀, centre of hindwings with markings missing; ♂ with large extra white spot. One *Maniola jurtina*, L., captured by Miss Frohawk, extreme white form. Two *Pararge aegeria*, L., true, with





ABERRATIONS OF *DASYCHIRA PUDIBUNDA*, L.

Exhibited at the Annual Exhibition in October by Dr J. Hope.
(but not recorded in the text).

amber-orange spots, captured by F.W.F. Two *Lycaena arion*, abs. *obsoleta*, Tutt, ♂♂. One *Coenonympha pamphilus*, L., right side (under) *obsoleta*, Tutt, captured by F.W.F.

Mr R. L. E. Ford exhibited preserved larvae of British Lepidoptera.

Mr S. W. Gadge exhibited the following items relating to the Hive Bee:—Wingless drone bee taken off brood comb in hive. Drone bees from a laying worker; these are smaller than normal drones. Drone comb built on hive division board, showing cells with vertical and pointed sides. Wasp nest built on brood combs in a beehive. Models of Ancient Greek coins with impressions of bees. Models of English Tokens with impressions of hives and bees. Photographs illustrating:—Work of the leaf-cutting bee on Laburnum leaves. Bees' nest from a wood, top view. Bees' nest from a wood, side view. Both views show unusual formation of combs. Syrian bear robbing a beehive. Nest of Great Titmouse in an occupied beehive. Nest of wasp two feet wide, taken from inside a house roof at Worcester Park. Meeting place for wasps where food is consumed. Wasp nest from the ground, it contains a stone, cricket ball size. An Abyssinian Secret.

Mr F. T. Grant exhibited the British species of *Cicindela* (Col.).

Dr H. G. Harris exhibited Lepidoptera from Sestrières and the Baths of Valdieri in N. Italy, including aberrations of *Adopoea lineola*, Ochs., from Sestrières, and albinistic and melanistic forms of *Maniola jurtina*, L., British.

Mr C. N. Hawkins exhibited:—(1) A preserved example of the very rare extreme red form of the larva of *Sphinx ligustri*, L. This larva was sent to me alive on 21st August last by Mr W. Lewis Rudland, who informed me that he found it on Privet at Ipsden, Oxfordshire. When received it was in its last stadium, though far from full-grown, but as it had travelled badly and was very wet, it was preserved at once for safety's sake and in consequence is rather small. Tutt, in his "British Lepidoptera," Vol. IV, pp. 315, 316, records several examples approaching this in colour, and Buckler ("Larvae," II, pl. XXII, fig. 2) has figured one of the lighter red forms. (2) A ♀ specimen of *Ematurga atomaria*, L., cream coloured with the lines chocolate brown and with no dark speckling or terminal markings, Sussex, 1937. A ♂ of this form was shown by Dr Cockayne at the Annual Exhibition in 1935 (cf. "S.L.E. and N.H. Soc. Proc. and Trans.," 1935-36, p. 32) and two ♂♂ were shown by him this year, but this is believed to be the only known ♀ of the form.

Dr J. Hope exhibited varieties of *Pieris napi*, L., and of *Argynnis paphia*, L., including *Pieris napi*, L., black variety taken by A. Swift of Nelson, 24th June 1926; reported "Ento.," Vol. LX, p. 11; an albino form; a gynandromorph, right side ♀, left side ♂; two banded forms of ab. *citronaea*. *Argynnis paphia*, L., gynandromorph taken by Dr Nash, New Forest, 1922, reported "Ento.," Vol. LV, p. 238, left side ♂, right side ♀, ab. *valezina*, Esp.; ab. *valezina*, Esp., extraordinary underside.

Mr G. E. Hyde exhibited an aberration of *Gonepteryx rhamni*, L., showing ♂ and ♀ colouring on all four wings; and a cabinet drawer of aberrations of *Heodes phlaeas*, L.

Mr F. W. J. Jackson exhibited underside aberrations of *Polyommatus coridon*, Poda, from Bembridge, I. of W.

Mr W. H. James exhibited aberrations of British Rhopalocera.

Mr Russell James, Sen., and Mr R. James, Jun., exhibited a series of captures at light in Epping Forest during 1937, including *Biston betularia*, L. (typical, "intermediate" and black); *Stauropus fagi*, L., all dark; dark *Boarmia roboraria*, Schiff., and others; also a box containing one night's captures at light at Balcombe in June 1937, including *Palimpsestis (Cymatophora) fluctuosa*, Hb., *S. fagi*, *B. roboraria*, *Acronicta leporina*, L., *Drymonia trimacula*, Esp., *Cochlidion limacodes*, Hufn. (*testudo*, Schiff.), and others.

Col. S. H. Kershaw exhibited aberrations of *P. coridon*, Poda, and of *M. jurtina*, L.

Dr H. King showed spring and autumn broods, including bred specimens, of *Cidaria otregiata*, Metcalf, from S.E. Devon, and from the same locality, *Cleora jubata*, Thnbg., *Percnoptilota obstipata*, Fb. (*fluviata*, Hb.) and *Nonagria sparganii*, Esp., from Surrey, a series of bred *Thera variata*, Schiff., from spruce, and a series of bred *Cucullia absinthii*, L., from N. Cornwall larvae.

Dr H. B. D. Kettlewell exhibited species of Lepidoptera taken and bred in 1937, including red New Forest forms of *Monima (Taeniocampa) gracilis*, Fb.; series of *Agrotis cinerea*, Hb., taken at light; series of *Dianthoecia conspersa*, Esp., bred from Land's End pupae with dark examples, and others with the normal white marking replaced with yellow; series of *D. andalusica*, Stdgr. (*barrettii*, Dbdy.); *Crymodes assimilis*, Dbldy., from Rannoch area; bred *Callimorpha dominula*, L., including one with fore-wings entirely black except two small white dots and two with smoky hind-wings; and others.

Col. F. A. Labouchere exhibited a fine series of Irish ♀ forms of *Polyommatus icarus*, Rott., from Galway.

Mr H. B. Lawson exhibited a cabinet drawer of British Moths.

Dr A. R. Lisney exhibited two specimens of *Hydrilla pallustris*, Hb., both males taken at Wicken Fen, 4.vi. and 11.vi.1935; and a small series of *Mnesipatris flicivora*, Myr., a recently discovered and very local species of moth from Co. Dublin ("Ent.," 194, 1937).

Mr Hugh Main exhibited some living spiders and scorpions, including examples of the dangerous "black widow" spider and young.

Mr H. A. Leeds exhibited 42 specimens of 13 species of British Rhopalocera, captured during 1937, amongst them being the following, for which Bright and Leeds' descriptive terms (not names) are used:—*Maniola jurtina*, L., ♂ upperside, lacticolor-transformis, *Aricia agestis*, Schiff.; undersides, transiens, antidiscoelongata, castanea, semialbescens. *Polyommatus icarus*, Rott., ♂ upperside, caeruleo-latimargo; ♂ underside, postdecrepens. *Polyommatus (Lysandra)*

coridon, Poda, ♂ uppersides, viridescens, caeruleo-infralavendula, ultraviridescens-ultralavendula-metallica; ♂ undersides, alba, Confluentiae (I-nigrum-arcuata-basijuncta), antijuncta. *Polyommatus* (*Lysandra*) *bellargus*, Rott., ♀ uppersides, sinis-costatransformis, virgatus, ultralutescens. *Neodes phlaeas*, L., ♂ upperside, auroradiata. *Strymon pruni*, L., ♂ underside, lutescens. *Hamearis lucina*, L., ♂ underside, antidex-transformis.

Rev. J. N. Marcon exhibited a very large number of aberrations of British Lepidoptera captured during 1936-7.

Mr H. Moore exhibited some large exotic Lepidoptera, *Thysania* sps., *Erebus* sps., and *Nyctalemon* sps.

Mr A. M. Morley exhibited a large number of British Lepidoptera, and also a few moths from Contrexeville in the Vosges.

(1) Rannoch, 16.v.—2.vi.1927, including *Erebia epiphron*, Knoch, *Coenonympha tullia*, Müll. (*davus*, Fb.), *Aplecta occulta*, L., bred, light and dark forms, *Rhyacia* (*Noctua*) *sobrina*, Gn., bred, etc.

(2) Contrexeville, Vosges, including *Zygaena achilleae*, Esp., *Lithosia pallifrons*, Zell., *Acidalia immorata*, L., *Aplasta ononaria*, Fuess., and others.

(3) Also *Rhyacia* (*Agrotis*) *ashworthii*, Dbldy., bred from N. Wales larvae, 1937; *Cucullia gnaphalii*, Hb., bred from larvae, Weald of Kent, August 1936; *Aplasta ononaria*, Fuess., Folkestone Warren, 26th June-1st July 1937; *Adopoea thaumas*, Hufn. (*linea*, Schiff.) (*flava*, Brun.).

Lieut.-Colonel A. H. E. Mosse exhibited forms of *Argynnis paphia*, L., and *Brenthis selene*, Schiff., from Frant; and *Vanessa urticae*, L., and *Mimas tiliae*, L., from Tunbridge Wells; also a bred example of *Daphnis nerii*, Linn., from Western India.

Mr C. G. Priest exhibited British Lepidoptera captured and bred from the Isle of Wight in 1937.

Mr L. W. Newman exhibited long series of *Abraxas grossulariata*, L., including abs. *dorhnii*, Kög. (*lacticolor*, Rayn.), *varleyata*, Porritt, *exquiseta*, Rayn., *hazeliensis*, Rayn., *nigrocretacea*, Rayn., etc. Full fed larvae of *Arctia caja*, L., which had been fed entirely on garden Arabis. Living specimens of *Hamearis lucina*, L., which emerged 27th October under normal conditions, not forced.

Mr S. G. Wallis Norton exhibited *Catocala fraxini*, L., ♂, taken September 1937, near Ashford, Kent. *Pieris napi*, L., var. *flava*, Tutt, taken May 1937, Wyre Forest, Worcestershire.

Mr G. B. Oliver exhibited *Euphydryas* (*Melitaea*) *aurinia*, Rott. Short series from an inbred Dorset strain:—Dark suffused; black banded and light banded forms. *Melitaea cinxia*, L., a wild, lightly marked ♂ and heavily spotted ♀:—A short series from wild larvae, showing variation from open banded to suffused forms, and a pair of undersides strongly marked with black on the hindwings. *Melitaea athalia*, Rott., ♂, wild, Kent, inner half of forewings clouded with black. *Argynnis paphia*, L., wild ♂ with heavy transverse inner band on underwings: ab. *valezina*, Esp.; specimens bred from both type and

ab. *valezina* ova. *Argynnis cydippe*, L. (*adippe*, L.), a richly marked underside ♂. *Aricia agestis*, Hb. (*medon*, Esp.), ♂ taken on Bucks Chilterns; black unmarked forewings and lightly marked hind wings; closely approaching var. *salmacis*, St. Also a series of British taken cuckoos' eggs with those of foster-parents selected to show variation of shades—brown, red, grey, olive and buff, with markings speckled, blotched or marbled.

Mr S. G. Castle Russell exhibited:—

Maniola jurtina, Schrank, an aberration blotched with white.

Brenthis (*Argynnis*) *euphrosyne*, Linn. A remarkable and very beautiful underside aberration, the silver basal spots being elongated into broad silver lunules. West Surrey.

Euphydryas (*Melitaea*) *aurinia*, Rott. Three colour aberrations.

Imenitis camilla, Linn. (*sibilla*, L.). Two examples of ab. *obliterata*, Shipp. New Forest.

Aphantopus hyperantus Linn. A multi-spotted example. Also an extreme example of homoeosis—underside—two-thirds of the wing area having the colour and structure of the upperside; taken by Mrs P. Nagle, Ringwood, 1934.

Pieris rapae, Linn. An example of ab. *fasciata*, Tutt. Highcliffe.

Euchloë cardamines, Linn. An example of ab. *dispila*, Raynor, and two richly marked undersides.

Aricia agestis, Schiff. (*medon*, Esp.) A male with the orange spots on borders replaced by white. Winchester.

P. (*L.*) *coridon*, Poda. Examples of under and upper side aberrations including ab. *cinnameus* (?), male and female. Ab. *fowleri*, Sth., and ab. *obsoleta*, Tutt, etc. Also 2 males: a rare blue form and one of French grey colour. Hants, Wilts and Sussex.

Polyommatus icarus, Rott. An example with *costajuncta* and *basi-juncta*, and one with *obsoleta-partim-radiata*, on the underside respectively. Weymouth.

All of the above with one exception were taken, or bred, by the exhibitor.

Mr E. E. Syms exhibited larvae, pupae and adults (macropterous) of the Mecopteron *Boreus hiemalis*, L.

Mr A. G. B. Russell and Mr J. A. P. Russell exhibited a selection of insects taken in the past year, including series of the following species:—*C. brevilinea*, Fenn., and *Pelosia muscerda*, Hufn., from County Norfolk; *Lithosia pallifrons*, Zell. (*lutarella*, Linn.), from Counties Kent and Norfolk; *Leucania l-album*, Linn., and *L. vitellina*, Hübn., from County Devon; *Endrosa* (*Setina*) *irrorella*, Linn., and *Procris globulariae*, Hübn., from County Gloucester; *Coscinia cribrum*, Linn., and *Nonagria sparganii*, Esp., from County Dorset (the latter a finely marked local form); *Isturgia* (*Fidonia*) *carbonaria*, Clerck, from County Perth; *Sterrhia ochrata*, Scop., from County Kent; and five *Drepana harpagula*, Esp., from the Leigh Woods. Examples were also shown of *Celaena haworthii*, Curt., from County Norfolk, side by side

with specimens of an insect that is apparently to be regarded as a distinctive local race of the same species, from County Dorset. Other insects included a large and well marked specimen of *Tapinostola fluxa*, Hb. (*hellmanni*, Ev.) (of a form that would be more readily paralleled among Continental than among British examples), from County Dorset, a species new to the County, as well as examples of *L. albipuncta*, Fabr., from County Dorset; *Coenoteophria berberata*, Schiff., from County Suffolk; *Ptychopoda dilutaria*, Hübn., from County Somerset; and *Anarta melanopa*, Thunb., from Co. Perth. Interesting variations were also included of *Phlogophora meticulosa*, Linn., the prevailing tint of the fore wings being a dark green, with very dark hind wings; *Mamestra dentina*, Esp., a melanic form; *Diacrisia lubricipeda*, L. (*menthastri*, Esp.), an example in which the usual black dots on the fore wings were reduced to a minimum; *Mellinia gilvago*, Esp., an orange form with heavy banding of black blots, of a type seldom occurring in this country, all from Swanage, the last named species being only once previously recorded for County Dorset (in 1907); and *Epunda lichenea*, Hübn., a very black ♀ from Portland.

Mr D. C. Sevastopulo exhibited a series of the Satyrid butterfly *Melanitis leda*, L., and its subsp. *ismene*, Cr., to show the individual variation of the nominotypical dry season form and the seasonal variation between it and the wet season generation *determinata*, Btlr.

Mr Hy. J. Turner exhibited numerous examples of the extreme forms, natural and produced, of *Abraxas grossulariata*, L.

Messrs R. F. Warrior and J. Deal exhibited *Polyommatus coridon*, Poda. A series of aberrations, upper and under side, illustrating the range of variation in the Swanage district of Dorset, 1937. The under-sides show varying degrees of obsolescence up to *corydonis*, Bergs., and *lucretia*, Gasc. The uppers range towards *fowleri*, South, on the one hand and *sub-suffusa*, Tutt, on the other. There are several minor forms. *Polyommatus icarus*, Rott. A gynandromorph, R. side ♀, L. side ♂. Brown form, few blue scales. Thoracic hairs on L. side definitely blue. Dorking district, Ranmore slopes, 20.viii.35. Series showing variation in blue coloration of females in same brood. Bred 1937.

Mr N. Watkins exhibited varieties of British Lepidoptera taken in 1937.

Mr H. D. Wells exhibited a gynandromorph specimen of *P. (L.) coridon*, Poda, taken at Royston, 5th August, 1937. R. wings ♂, L. wings ♀.

A series of ab. *semisyngrapha*, Tutt, and some ab. *semi-obsoleta*, Tutt, including a fine ♀ with whitish hindwings; also an *Argynnis paphia*, L., with heavy black markings, and two *Polygonia c-album*, L., with a triangle for the usual "comma" mark, from the Wye Valley.

Mr S. Wakely exhibited nearly 300 different species of Lepidoptera captured and bred during the present season, including:—*Myelois ceratoniae*, Zeller (bred from larva feeding in Spanish orange);

Laspeyresia molesta, Busch. (bred from larva feeding in Italian peach); and *Nepticula suberivora*, Stainton (bred on September 2nd from mined leaf of Evergreen Oak from Freshwater, I.W.). Also: *Nudaria mundana*, L. (bred, Stroud, Glos.); *Setina irrorella*, Clrck. (bred, Freshwater, I.W.); *Earias chlorana*, L. (bred, Norwood, London); *Acronicta ligustri*, Fb. (bred, Godshill, I.W.); *Erastria* (*Monodes*) *venustula*, Hb. (bred, Brentwood, Essex); *Leptomeris marginepunctata*, Göze (bred, Sandown, I.W.); *Salebria formosa*, Hw. (bred, Plumstead, Kent); *Myelois neophanes*, Durr. (bred, Broadwater Forest, Sussex, and Chilworth, Surrey); *Crambus uliginosellus*, Z. (Byfleet, Surrey); *C. contaminellus*, Hb. (Norwood); *C. selasellus*, Hb. (Benfleet, Essex); *Pyrausta verbascalis*, Schiff. (Boxhill, Surrey, and Byfleet); *Stenia punctalis*, Schiff. (Freshwater); *Evergestis straminealis*, Hb. (Byfleet); *Adaina microdactyla*, Hb. (bred, Sandown); *Alucita spilodactyla*, Curt. (bred, Freshwater); *Pselnophorus brachydactylus*, Tr. (bred, Stroud); *Pterophorus lienigianus*, Zell. (bred, Plumstead, Kent); *Phalonia gilvicomana*, Z. (bred, Surrey); *Peronea comariana*, Zell. (bred, Rookley, I.W.); *P. boscana*, Fb. (bred, Osborne, I.W.); *Evetria purdeyi*, Durr. (Gurnard, I.W.); *Hemimene sequana*, Hb. (bred, Gurnard); *Metzneria littorella*, Dgl. (bred, Ventnor); *Gelechia lentiginosella*, Zell. (bred, Gurnard); *Batrachedra pinicolella*, Dup. (Ashdown Forest, Sussex); *Chamaesphecia* (*Aegeria*) *ichneumoniformis*, Fb. (Freshwater); *Depressaria nanatella*, Stain. (bred, Stroud); *Stathmopoda pedella*, L. (Bromley, Kent); *Coleophora albicosta*, Hw. (St George's Down, I.W.); *C. artemisicolella*, Brnd. (bred, Plumstead, Kent); *Stigmella decentella*, H.-S. (Norwood); *Tinea arcella*, Fb. (bred, Westerham, Kent); *Teichobia verhuellella*, Stain. (bred, Stroud).

Dr H. B. Williams exhibited series of Lepidoptera from Scotland, 1937:—

(1) Series of *Eumenis semele*, L., from Morayshire, with a normal English pair for comparison, including a ♂ with extra spots, and ♀♀ with clear yellow band on outer half of forewings, and lighter scaling on fuscous basal portion of forewings.

(2) *Lygris populata*, L., series, unselected, from Grantown, with dark forms.

(3) *Thera juniperata*, L., bred, Aviemore, with melanic forms and band variations.

Dr C. M. G. de Worms exhibited a number of local and uncommon British Lepidoptera from various localities taken or bred during 1937, including series of *Argynnis euphrosyne*, L., Rannoch; *Erebia aethiops*, Esp., Lake District; *Coenonympha pamphilus*, L., Aviemore; *Plebeius aegon*, Schiff., North Wales, with blue forms of the female; and aberrant forms of *Apatura iris*, L. (one male and two females bred from wild larvae beaten in late May); *Hyloicus pinastri*, L. (three examples found at rest in Suffolk in early July); *Drepana harpagula*, Esp. (*sicula*, Hb.) (five males taken at light near Bristol in June); *Spilosoma lubricipeda*, L. (*menthastri*, Esp.) (two sparsely spotted females taken

in Tilgate Forest); *Dianthoecia conspersa*, Esp. (dark example bred from Scotland); *Leucania l-album*, L., and *L. vitellina*, Hb. (series taken in South Devon in September); *Zygaena lonicerae*, Esp. (two yellow forms taken in Gloucestershire).

Mr S. N. A. Jacobs exhibited larvae of *Mnesipatris flicivora*, Meyr. (1937), feeding in leaves of *Aspidium filix-mas*, Sw. (male fern), together with a drawing illustrating the feeding habits of the larva, first in the spores and then mining into the leaf; and also an enlarged profile view of the larva. It is to be noted that these larvae are extremely voracious, and they remove all the green flesh from each leaf mined, and then pass on to another leaf. Some of the larvae seem to have spun an oval cell in the mine for hibernation, while others pupated in cocoons composed of white silk covered with the brown spores and frass. Moths emerged, the first on 5th January 1938, and continued to emerge in twos and threes per day up to the time of writing (25.ii.38), warm days producing more than the colder days. The larvae were received from Mr Bryan Beirne, of Monkstown, County Dublin, whose report of the species appeared in the "Entomologist" for 1937, together with Mr Meyrick's original description of the species.

11th NOVEMBER 1937.

The PRESIDENT in the Chair.

Mr Royffe exhibited vipers from the New Forest and several snakes from S. India preserved in spirit.

Mr Denvil exhibited two living specimens of the Dice Snake, *Tropidonotus tessellatus*, with several cast skins of the same; also the common viper, *Pelias berus*.

Dr Cockayne exhibited a short series of *Parascotia fuliginaria*, L., including a very pale aberration with grey ground colour and increase in the pale yellow markings. It was bred, Surrey, July 1937.

Mr McNulty exhibited a number of snakes preserved in spirit and read a short paper on "Snakes"; a considerable discussion ensued.

25th NOVEMBER 1937.

The PRESIDENT in the Chair.

The following were elected members:—Col. P. A. Cardew, of Wimbledon; Dr J. Hope, of Cheadle Hulme, Cheshire; Messrs R. W. Adams, of Kenton; N. T. Easton, of Kensington; Dr H. G. Harris, of Southampton; H. O. Holford, of Godalming; A. A. Lisney, of Leicester; M. J. Mowbray, of Wanstead; A. E. Tonge, of Alderley Edge; and F. T. Vallins, of Epsom Downs.

Mr Doudney exhibited a bred series of *Pachygastria trifolii*, Esp., from larvae taken at Dungeness with examples from Formby for comparison; also a number of species of Lepidoptera taken at Aviemore.

Dr E. A. Cockayne exhibited a number of preserved larvae of *Noctuidae*.

Mr Wallis Norton exhibited Lepidoptera from N. India and explained his method of relaxing for setting specimens when received in papers.

Mr Stephens exhibited the following species of Coleoptera, mostly from the Chatham area:—*Quedius longicornis*, Kr.; *Acidota crenata*, Fb.; *Prognatha quadricornis*, Kby., Hadham; *Bathyscia wollastoni*, Jan.; *Amphicyllis globus*, Fb., in hay refuse; *Scaphisoma boleti*, Pz., fungi in September; *Triplax lacordairei*, Crtch., fungi in September; *Necrobia ruficollis*, Fb., from a dead bird; *Opilo mollis*, Linn.; *Dascillus cervinus*, Linn., from a spindle tree; *Hylotrupes bajulus*, Linn.; *Cassida nobilis*, L.; *Rhinosimus ruficollis*, L., under bark; *Heledona agaricola*, Hbst., in fungus, September.

Lantern slides were shown by Mr E. E. Syms and Mr Finnigan, and afterwards a selection of slides from the Robert Adkin bequest.

9th DECEMBER 1937.

The PRESIDENT in the Chair.

Mr A. W. Roswyn, 141 Perry Vale, Forest Hill, S.E.23, was elected a member.

Proposed by Mr Attwood and seconded by Dr Cockayne that Mr Sutton be asked to act as auditor on behalf of the general body of members.

Mr H. W. Andrews exhibited specimens of the scarce Dipteron *Myopites blotii*, Breb., belonging to the *Trypetidae*, from Yarmouth in the Isle of Wight.

Mr D. G. Sevastopulo exhibited a collection of moths taken at light at Darjeeling and read the following note:—

“This exhibit shows an average May evening’s catch at light between dusk and 11 p.m. (the species shown are those actually recorded in my diary for the 30th May 1935) and illustrates the fact that Indian moths are not markedly larger or more brilliant in colour than English.

“The method of collecting employed was to leave an electric light burning in a room with whitewashed walls and to catch from time to time the moths attracted. One of the features of collecting with light in the Himalayas is the large number of single specimens taken; during a month’s collecting in May and early June I took roughly three hundred species and of these more than half were represented by single examples. Figures of the nightly catches for three evenings in August 1934 are also interesting: on the 9th 31 species were taken, on the 10th 61, of which 10 only had appeared on the previous evening, and on the 11th 51 species were caught, of which 35 had not been seen before.

Mr Wallis Norton described his method of relaxing and setting “papered” insects.

"I have to thank Mr Sevastopulo for making the method I have previously described rather easier, in that I now make up a relaxing tin of half an inch of sand, moistened to a state of saturation with methylated spirits and water, on top of which I place a platform made of perforated zinc, on the underside of which, touching the sand, are five corks. These corks are about one inch thick and are placed one in each corner and one in the middle and held in position with drawing-pins. Upon this platform the insects are placed and left for 48 hours.

This period may be more than sufficient for completely relaxing some of the smaller insects. I had none to experiment with, but with the larger ones I found that although the antennae and sometimes the head could be moved without breaking away, the main nervures joining the wings to the body were still too stiff to move without the danger of breaking.

I then apply, by means of a camel-hair brush, a small amount of amyl-acetate to the underside where the wings join the body and then a bead of "Durofix," no larger than a pin's head and subsequently wash this in with a little more amyl-acetate.

About ten minutes later the insect will be fit to set and even if that ominous crack is heard when the setting needle is pressing the wing downwards there need be no fear that the wing has broken away from the body. The pressure of the setting needle should be made as near to the body as possible.

Having secured the wings roughly in position with paper strip, leave for a few minutes longer until the solution has worked well in and then it will be found that the wings can be placed in the desired position with comparative ease. The insect will be ready for removing from the setting board in about 24 hours.

I have performed two tests, as follows:—

(1) I have taken an insect which has been off the setting board for 24 hours and placed it back in the relaxing box for 48 hours. The sole result was that the wings were inclined to cockle up a little but their position in relation to the body did not change.

(2) I deliberately set an insect badly, put it back in the relaxing box for 48 hours and then back on to the setting board and was unable to set the wings, but having once more applied a little amyl-acetate and leaving for about a quarter of an hour I was able to move the wings into the required position.

General Information.

I would advise the use of a setting board rather larger than the one you would normally use for any particular insect in order that there be plenty of space between the body of the insect and both the edge and the base of the groove. This will eliminate any danger of the insect sticking to the board.

To ensure the antennae not breaking away and to facilitate moving the head, should it have dried in an undesirable position, apply a drop of amyl-acetate, without Durofix, and set almost immediately.

After the insect has been removed from the setting board I would advise a small bead of Durofix being applied where the pin emerges. This will prevent the insect swivelling on the pin at some later date.

Some extremely interesting and instructive cinematograph films were shown by Dr Hewer depicting chromosome division, cell-multiplication, life-history, etc., of the Amoeba, Earth Worm, Marine Worms and a Sea Urchin. Dr Hewer accompanied the films with appropriate remarks explaining and drawing attention to the more important points illustrated.

13th JANUARY 1938.

The PRESIDENT in the Chair.

Mr J. Deal, 18 Manor Road, West Wickham, Kent, was elected a member.

Mr R. Collins exhibited an unusual form of *Boarmia (Ectropis) bistortata*, Göze, second brood taken at light at Kingswood, Surrey. Thorax and first two segments of abdomen very dark; forewings generally greyish brown, most markings slightly darker giving a fuzzy, semi-suppressed impression, especially the sub-basal and median lines; subterminal line wide, lighter and irregular, edged externally with an interrupted darker line which in its turn gives place to a fine light coloured line; hindwings as forewings. The veins and interneural spots of the typical form show clear and dark. (See plate).

Mr E. E. Syms gave an account of his study of the Life-history of the Wood Cricket, *Nemobius sylvestris*, Fab., illustrating his remarks with lantern slides. (See Trans.)

Mr S. Wakely exhibited a series of the very local Micro-lepidopteron, *Metzneria littorella*, Douglas, from the Isle of Wight, and read a short paper on its habits and occurrence. (See Trans.)

27th JANUARY 1938.

ANNUAL MEETING.

Mr F. J. COULSON, PRESIDENT, in the Chair.

The Reports of the Treasurer and Council and the Balance Sheet were read and adopted.

The following is the List of Officers and Council declared by the President as elected for the year 1938:

President—F. S. Stanley-Smith, F.R.E.S. *Vice-Presidents*—F. J. Coulson and H. B. Williams, LL.D., F.R.E.S. *Hon. Treasurer*—T. R. Eagles. *Hon. Librarian*—E. E. Syms, F.R.E.S. *Hon. Curator*—S. R. Ashby, F.R.E.S. *Hon. Editor of Proceedings*—Hy. J. Turner, F.R.E.S., F.R.H.S. *Hon. Secretaries*—S. N. A. Jacobs (*Corresponding*) and H. G. Denvil (*Minuting*). *Hon. Lanternist*—J. H. Adkin. *Council*—C. H. Hawkins, F.R.E.S., A. Bliss, H. W. Andrews, F.R.E.S., J. H. Adkin,



Photo. R. J. Collins.

BOARMIA (ETROPIS) BISTORTATA, GOZE ab.

L. C. Bushby, F.R.E.S., M. Niblett, A. F. O'Farrell, R. Attwood, G. A. Brett, B.Sc., A.R.C.S., G. V. Bull, B.A., M.B.

It was announced that in view of his having completed the 50th year of his membership of the Society, and of his long and distinguished services, both to the Society as one of its Officers for many years, and to Entomology in general, the Council had conferred upon Mr Hy. J. Turner the Honorary Membership of the Society, and an Illuminated Address of Congratulation was subsequently presented to him on behalf of the Officers, Council and other Members by the President, Mr F. J. Coulson, who said:

I am honoured by having to perform a very pleasant duty. Mr Turner as you know joined the Society in 1887 and has therefore been a member for a period of 50 years. In itself this is truly a remarkable achievement, but it is coupled with the fact that during that period he has been more than an ordinary member, as he has taken an active part in conducting the affairs of the Society during the greater part. He was the Hon. Librarian from 1893 to 1896 when he became the Report Secretary. In 1915 Mr Turner became Vice-President and in the subsequent two years, 1916 and 1917, he occupied the Presidential chair. In 1916 he combined the duties of Report Secretary and those of Hon. Editor of the Proceedings, which, as you know, he at present holds. During practically the whole of his membership therefore the Society has benefitted not only by his constructive work but, as his great knowledge of scientific matters has been placed freely at our disposal, the Proceedings have been maintained at the highest level. We owe a debt of gratitude to Mr Turner, but we also are grateful to Mrs Turner and thank her for her care and willingness that has enabled Mr Turner to give so much time to the Society's affairs.

As a token of our appreciation of the work he has performed for the Society and in commemoration of the fact that he has been a member for so long a period I have, on behalf of the Society, great pleasure in asking him to accept this autograph book inscribed with the names of the members.

This announcement and the presentation having been received with acclamation, Mr Turner briefly replied on behalf of himself and of Mrs Turner, and expressed his appreciation of the kindly consideration of members at all times and of the pleasure it had always been to be of service to the Society.

The President read the Annual Address (See Trans.) and the new President, Mr F. S. Stanley-Smith, then took the chair.

Votes of Thanks were passed to the retiring President, Officers and Council for their services during the past years.

ORDINARY MEETING.

Mr F. S. STANLEY-SMITH, PRESIDENT, in the Chair.

Dr Cockayne exhibited illustrations of the larvae of the American *Papilio*, *P. rudkini*, the representative of the British *P. machaon*, L.,

and said that the variation in colour and marking was quite parallel with the variation in the larvae of the British species, of which he also showed several preserved examples for comparison.

Dr Williams exhibited the aberration *salicis*, Curt., of *Acronicta rumicis*, L.

Mr Hy. J. Turner exhibited three males and one female of the large Brazilian Bombycid moth, *Eacles imperialis*, Drury, with a coloured photograph of the beautiful larvae, sent to him by a correspondent some years ago.

He also exhibited a hitherto unrecorded form of *Leucania impura*, Hb., from Paignton, Devon, sent to him by Capt. Parsons. Above the outer half of the long whitish vitta along the disc of the forewing there is developed in the partial fold a jet black line. Most examples of this species have no differentiation in the usual marking in this position, but a few have a slight brownish darkening and very occasionally a specimen occurs with a very few black scales. Another similar form, but not so strongly marked, from Esher was shown. It is proposed to name it *nigrolinea*, nov. ab. He called attention to the well-marked ab. *punctilinea*, Tutt, from Rainham (Burrows collection) with a perfect row of submarginal dots, a form said to be "rare" by Tutt.

Capt. Parsons sent, in the same box, an extremely dark form of *Omphaloscelis lunosa*, Haw. This very variable species easily divides into two groups. In the one the forewings are conspicuously lined by the light coloured veins, in the other the veining is very inconspicuous. Tutt, in "British Noctuae," II, 169, includes an extreme form as "Blackish-grey, with pale nervures," var. *agrotoides*, Gn. (also exhibited). The form shown is very dark reddish, almost blackish, without the conspicuous veining, and is still further melanic in that the hindwings are completely smoky, a feature hitherto not recorded of this species. Another feature is the suppression of the generally conspicuously light marginal band on the forewings of all the darker specimens. This form may well be named *intensa*, nov. ab.

Mr T. R. Eagles exhibited the bamboo, *Phyllostachys aurea*, with flower heads. Bamboo plants flower after long intervals and often die immediately afterwards.

REPORT OF FIELD MEETINGS.

10th APRIL 1937.

FIELD MEETING—EFFINGHAM.

Leader: Mr T. R. EAGLES.

Thirteen members and one visitor attended. The weather was not bright or particularly warm, but there was no rain. In the afternoon a visit was made to the pines at Ockham Common. The lepidopterous larvae beaten were mainly *Thera obeliscata*, Hb., but there were also *Thera firmata*, Hb., and *Ellopiia prosapiaria*, L. Imagines of *Panolis griseo-variegata*, Göze, were taken, some by searching the pine trunks and others fell into the beating trays. *Brephos parthenias*, L., was observed flying near the birches and *Xylocampa areola*, Esp., was resting low down on the pine trunks. The interesting and not too well known larva of *areola* was successfully reared from eggs laid by one of the moths. *Sarrothripus revayana*, Tr. (the usual dark form), *Tephrosia bistortata*, Gr., the Gracillariid, *Ornix avellanella*, Staint., and the beautiful little Micropterygid, *Eriocrania purpurella*, L., were seen.

Specimens of all the usual pine lady-birds were observed (*Anatis ocellata*, L.; *Mysia oblongoguttata*, L.; *Aphidecta oblitterata*, L.; *Chilocorus bipustulatus*, L., and *Exochomus quadripustulatus*, L.). The large pine weevil, *Hylobius abietis*, L., was noticed; no doubt many would have been found if special search had been made. *Balaninus rubidus*, Gyll., was also found in the beating tray. Several specimens of the Longicorn beetle, *Pogonochaerus hispidus*, L., were beaten from the holly bushes on the walk back to tea.

All the party stayed on for sallowing. The long spell of wet weather had made some of the bushes inaccessible to those without gumboots. Nevertheless some Taeniocampids were taken, including *T. gracilis*, Fb., and *T. munda*, Esp. *Selenia bilunaria*, Esp., and *Eariophila badiata*, Schiff., were flying freely. But the most pleasing discovery was *Bapta distintaria*, H.-S. (*Aleucis pictaria*, Curt.). This insect was in good numbers on the sloe bushes and a few were on the wing.

17th APRIL 1937.

FIELD MEETING—BOOKHAM COMMON.

Leader: C. N. HAWKINS, F.R.E.S.

This meeting was arranged to take advantage of the last opportunity for sallowing and general evening work before "Summer Time" began on the following day. As it happened, however, it was completely spoilt by the weather. A prolonged period of heavy rain right up to the very

morning had rendered most of the Common and woods a veritable morass, indeed much of the lower-lying portion of the ground was, literally, under water and although conditions improved somewhat during the afternoon, rain came on again in the evening and all this, combined with a decidedly cool N.W. wind and the fact that such Sallows as remained in good flower had had most of their attractiveness washed completely out of them, rendered conditions practically hopeless for collecting or observations of any sort. In spite of all the disadvantages, nine members put in an appearance but, beyond a certain amount of exploring over the higher portion of the woods on both sides of the Cobham Road, little serious work was attempted or, indeed, possible. A very good tea was much enjoyed at the Mark Oak Gate Tea Rooms adjoining the Common, after which most of the party dispersed to their homes and drier conditions. A few stayed on to try their luck in the evening, but, I fear, without much success. One or two Sallows in sheltered places in the woods harboured a few moths, mostly of the genus *Monima* (*Taeniocampa*) and there were a few Blackthorn bushes well out which also produced a few insects. The list of captures included the following species:—

LEPIDOPTERA:—*Sarrothripus revayana*, Scop., *Pachnobia rubricosa*, Fb., *Monima pulverulenta*, Esp. (*cruda*, Tr.), *M. gothica*, L., *M. munda*, F., *Earophila badiata*, Schiff., *Eupithecia castigata*, Hb., *Selenia bilunaria*, Esp., *Calostigia multistrigaria*, Haw. (LARVAE)—*Hylophila bicolorana*, Fuessl., *Opisthograptis luteolata*, L., *Boarmia repandata*, L., *Hemithia aestivaria*, Hb. (*strigata*, Müll.), and *Crocallis elingvaria*, L.

COLEOPTERA:—*Bryaxis sanguinea*, L., *Adalia 10-punctata*, L., *Pogonocherus hispidulus*, Pill., *Chalcoides aurata*, Marsh., *Otiorrhynchus singularis*, L.

8th MAY 1937.

FIELD MEETING—WESTERHAM.

Leaders: Mr F. D. COOTE, F.R.E.S., and Mr S. N. A. JACOBS.

This meeting was on the whole most disappointing; a cold north wind was blowing and vegetation was backward, but none the less some eight members attended and worked the district pretty thoroughly. Certain common species were taken in reasonable numbers, and Sesiid larvae were taken from birch and sweet chestnut stumps, while the alder trees along the side of the road in Westerham, where it borders the lake, provided larvae in plenty of *Tinea arcella*, Fb., which were mining just under the bark of the dead wood, their galleries showing up, slightly raised, and made more conspicuous by the white frass appearing more or less continuously along the gallery.

Tea was taken at Pitt's Cottage, and the party dispersed to deal with the material collected.

The captures included the following:—

LEPIDOPTERA:—(Imagines) *Cosymbia punctaria*, L., *Gonodontis bidentata*, Clrck., *Boarmia punctinalis*, Scop. (*consortaria*, Hb.), *Gymnoscelis* (*Eupithecia*) *pumilata*, Hb., *Eupithecia castigata*, Hb., *Aristotelia ericinella*, Dup.

(Larvae) *Oporinia autumnata*, Bork., *Campaea* (*Metrocampa*) *margaritata*, L., *Agrotis* (*Graphiphora*) *agathina*, Dup., *Noctua c-nigrum*, L., *Amathes helvola*, L., *Lygris testata*, L., *Synanthedon* (*Sesia*) *culiciformis*, L. (birch), *S.* (*S.*) *vespiformis*, L. (*cynipiformis*, Esp.) (*asiliformis*, Rott.) (sweet chestnut. Imagines subsequently bred).

COLEOPTERA:—*Rhynchites cavifrons*, Gyll., *R. betulae*, L., *Strophosomus melanogrammus*, Forst., *Polydrosus mollis*, Stroem, *P. teretis*, De G., *P. cervinus*, L., *Phyllobius argentatus*, L.

15th MAY 1937.

FIELD MEETING—ABROOK AND ESHER COMMONS.

Leader: Mr F. J. COULSON.

The weather was cold and there was little sunshine the whole day but as eleven members attended the meeting their efforts resulted in a good bag in spite of the conditions. The morning was spent on Abrook Common and in the afternoon the party scattered over Esher Common. In the evening a few members spent a short time on the heath near the station, where the usual Coleoptera were swept from the heather.

The morning party gave considerable attention to beating oak, birch, and hawthorn for lepidopterous larvae. The result was fair, the following larvae being taken in moderate number: *Oporinia dilutata*, Schiff., *Campaea* (*Metrocampa*) *margaritata*, L., *Hemithea aestivaria*, Hb. (*strigata*, Müll.), *Crocallis elinguaris*, L., *Colotois* (*Himera*) *penaria*, L., and *Miselia oxyacanthae*, L. *Hipparchus* (*Geometra*) *papilionaria*, L., and *Hylophila bicolorana*, Fuessl., were also taken. From coniferous trees were beaten *Ellopiopsis prosapiaria*, L. (*fasciaria*, L.), *Thera obeliscata*, Hb., and *T. firmata*, Hb., and both pupae and larvae of *Bupalus piniaria*, L. The terminal shoots of willow, tenanted by larvae of *Platania retusa*, L., were collected on Esher Common later in the day. Few imagines were taken or observed, *Cosymbia punctaria*, L., *Eupithecia nanata*, Hb., and *Semiothisa liturata*, Clrck., only being reported.

As regards Coleoptera, *Salpingus castaneus*, Panz., *Mysia oblongoguttata*, L., *Hylobius abietis*, L., and *Scymnus suturalis*, Thnb., were beaten from Coniferae. From stumps the following were extracted:—*Elatér balteatus*, L., *Leistus spinibarbis*, F., and *Litargus connexus*, Geoff., together with the bug, *Aradus depressus*, Fab. *Diphyllus lunatus*, Fb., was present in the fungus *Daldinia concentrica*, Ces., on birch trunks. The usual common species, as *Prosternon holosericeus*, Ol., were present on hawthorns in fair numbers. *Rhagium bifasciatum*, Fb., *Leistus ferrugineus*, L., *Dromius 4-notatus*, Panz., *Dacne bipustulata*, Thunb., and *Coeliodes ruber*, Marsh. were also taken.

Specimens of a caddis fly, *Glyphotaelius pellucidus*, Oliv., were taken by one member of the party.

22nd MAY 1937.

FIELD MEETING—CHILWORTH.

Leader: Mr A. F. O'FARRELL.

Early morning sunshine tempted seven members (not, however, including the official leader) to assemble at Chilworth station at 11.45 a.m., by which time, under a lowering sky, squalls of rain were sweeping a thoroughly saturated countryside. The sturdy seven, undaunted by the weather, made for the spruce wood at the foot of St Martha's Hill, where several *Thera variata*, Schiff., *Eupithecia tantillaria* Bdv. (*pusillata*, Hb.), were seen, and *E. lariciata*, Frr., were present but very restless because of the rain; most of them low down among the undergrowth. Three members of the party vanished at this stage, but the remaining four struggled up the hill, beating oak and wych elm under very tiresome conditions, gusty wind and heavy rain combining to make the beating trays weigh a good "half-hundredweight." Little success was met with before lunch, which was partaken of under the dripping branches of a spruce tree near the hill-top. Among the spruce and larch around this spot the above species were in some number again. Beating was resumed with rather better success and the larvae met with among others were *Thecla w-album*, Knoch, *Hylophila bicolorana*, Fues., *Brachionycha sphinx*, Hufn., *Mellinia gilvago*, Esp., and *Laspeyria flexula*, Schiff., and an imago of *Cosymbia punctaria*, L. After wandering around the back of the hill, which was rather more sheltered from the rain, the party adjourned to the "Percy Arms" for tea, where the three "deserters" had already arrived. The whole party were thus able to return home together, having had a not entirely unsuccessful day. The other species observed included:—Imagines of *Xanthorhoe fluctuata*, L., *Nemophora swammerdammella*, L., and *Adela viridella*, L. Larvae of *Amphipyra pyramidea*, L., *Amathes circellaris*, Hufn., *Calymnia trapezina*, L., *Phigalia pedaria*, Fb., *Colotois pennaria*, L., *Oporinia dilutata*, Schiff., *Erannis defoliaria*, Clrck., *Operophtera brumata*, L., *O. fagata*, Scharf. (*boreata*, Hb.), etc.

30th MAY 1937.

FIELD MEETING—ISLE OF WIGHT.

Leader: Mr S. WAKELY.

The Isle of Wight is rather beyond the range of the usual Field Meeting, but about ten members met at Waterloo for this trip.

After travelling to Portsmouth by one of the Southern Railway's new electric trains the party had a pleasant trip by steamer to Ryde, and then caught a train to Brading, which was reached about mid-day.

First the marsh was visited on the way to the cliffs to the east of Sandown. Larvae found on *Epilobium* were a mixed lot, and subsequently produced imagines of *Cacoecia podana*, Scop., *Tortrix costana*, Fab., and *Argyroplote lacunana*, Dup.

Approaching the top of the cliffs, the larval cases of *Coleophora troglodytella*, Dup., were noticed swarming on *Inula dysenterica*, Gaertn., and imagines of *Glyphipteryx fischeriella*, Zell., occurred in abundance on various flowers and grasses. *Melitaea cinxia*, L., was soon seen flying on the broken ground of Redcliff, but it was found that, owing to the rough nature of the ground, they were not easy to capture as they flew briskly among the great masses of *Anthyllis vulneraria*, L. (Kidney Vetch), which grow there, and no large "bag" was taken. *Cupido minimus*, Fuessl., was also on the wing, but scarce. Both *Vanessa atalanta*, L., and *V. cardui*, L., were noted, together with *Plusia gamma*, L. *Aspitates (Crocota) ochrearia*, Ross., was fairly common, and single specimens of *Ptychopoda subsericeata*, Haw., and *Leptomeris marginepunctata*, Göze, were captured. The webs of the local *Nephopteryx genistella*, Dup., were not uncommon on gorse, but it was a slow and painful job to extract the larvae from their thorny retreat. The local Plume, *Adaina microdactyla*, Hübn., was found just coming out in a clump of *Eupatorium cannabinum*, L., at Limpet Run, and a few were bred later from old stems gathered at this spot.

Mr H. G. Jeffery, who lives in the Island and is well known to several of the members, joined the party on the cliffs. He reported the capture of a series of a local beetle—*Ceuthorrhynchus asperifoliarum*, Gyll., by sweeping plants of *Lycopsis arvensis*, L., which were growing in profusion at one spot. A pair of Sheld-duck, *Tadorna cornuta*, Gmel., were seen by him to fly into the rabbit warren at the top of Lower Greensand Cliffs about 200 feet from the shore, and it is likely they were nesting there. *Silene nutans*, L., the Nottingham Catchfly, was observed growing in clumps at the top of Redcliff.

The most noteworthy record of the day was the Field Cricket (*Gryllus campestris*, L.), which was located by Mr E. E. Syms, who made a special journey on his own to Newchurch in search of it. He reported a colony "in full song" on the Downs, and secured two males by digging them out. It is gratifying to know that this now rare cricket is still to be found in the Island.

After tea at Sandown the party caught a train to Ryde, arriving back at Waterloo about 9.30 after quite a memorable day.

6th JUNE 1937.

FIELD MEETING—BROADWATER FOREST.

Leader: Dr G. V. BULL, B.A., M.B.

The Annual Field Day of the Society at Broadwater Forest was well attended and the weather was fine. Lepidoptera were less numerous than usual. Only 23 species of Macro-lepidoptera were recorded, of

which the most noteworthy were *Pheosia tremula*, Cl. (*dictaea*, L.), *Palimpsestis fluctuosa*, Hb., and *Aplecta tincta*, Brahm. *Semiothisa notata*, L., *Hydriomena coerulata*, Fb. (*impluviata*, Hb.), and *Erastria pygarga*, Hufn. (*fasciana*, L.), were also taken.

Of Microlepidoptera *Roeslerstammia erzlebella*, Fb., *Phalonia nana*, Hw. (extraordinarily abundant), *Oxyptilus tetradactyla*, L. (larvae), *Phtheocroa maculasana*, Haw., *Oecophora geoffrella*, L., *Borkhausenia flavifrontella*, Hb., *Lampronia luzella*, Hb.

And Larvae of *Salebria betulae*, Göze, of *Acalla aspersana*, Hb., and of *Cosmotriche potatoria*, L.

Of Neuroptera, *Osmylus chrysops*, Hag., and *Sialis fuliginosa*, Pict.

Of Diptera, *Tipula gigantea*, Schrnk., and *Sericomyia lappona*, L.

Of Hymenoptera, *Tenthredo chloris*, , and *Pezomachus instabilis*, Fst., from a cocoon on a grass stem.

Of Coleoptera, *Abdera flexuosa*, Payk., in hard fungus on birch stems. *Lochmaea crataegi*, Forst., *Galerucella lineola*, Fb. and ova plentiful on alder. *Deporaus betulae*, L., on alder and beech as well as on birch. *Melasis buprestoides*, L., in dead birch. *Hister cadaverinus*, Hoff., *Anatis ocellata*, L., *Mysia oblongoguttata*, L.; the last two species being more commonly reported from Surrey.

Of Trichoptera, *Glyptotaelius pellucidus*, Oliv.

12th JUNE 1937.

FIELD MEETING—ASHTHEAD.

Leader: Mr R. W. ATTWOOD.

Although the weather was splendid only five members attended, but the party, though small, managed to secure a good variety of species.

The Epsom Common area was not worked as we heard it was flooded and very muddy, so confined our attention to the Ashtead Woods. There are some magnificent Oak trees here, and a number of very old trees that have been neglected and are in that state of decay which appears ideal as hunting grounds for the coleopterist and workers in the other orders

Heodes (*Chrysophanus*) *phlaeas*, L., *Hesperia malvae*, L., *Erynnis* (*Nisoniades*) *tages*, L., and *Pamphila sylvanus*, Esp. [= *Ochlodes venata*, Br. & Gry. of the R.E.S. List] were just emerging and in beautiful condition. Several *Argynnis euphrosyne*, L., were taken along the pathway by the enclosed Wood, but were rather worn. *Boarmia punctinalis*, Scop. (*consortaria*, Hb.), was fairly common, some eight specimens being secured, among them a gynandromorph, but unfortunately not in the best condition. One antenna is simple and the other ciliated. *Erastria pygarga*, Hufn. (*fasciana*, L.), was taken during the afternoon, but occurred more frequently in the evening when six were captured and several missed. A female *Plagodis dolabraria*, L., was found on an oak trunk.

Larva beating produced, among others, *Lymantria monacha*, L., *Hydriomena furcata*, Thnbg. (*sordidata*, Fb.), *Brephos parthenias*, L., *Phaeosia* (*Notodonta*) *dictaeoides*, Esp., *P. tremula*, L., and *Lophopteryx* (*Odontosia*) *camelina*, L.

A small bush which appeared to be a Crab Apple but whose leaves were too much eaten to be identified, was covered with a web containing hundreds of small black and white micro-lepidopterous pupae which proved to be *Scythropia crataegella*, L. Although the bush at Ashtead was not so densely covered as the hawthorn figured in our Proceedings for 1931 it was still very noticeable.

Some of the Oak trees were badly infested by *Tortrix viridana*, L., of which the imagos were very abundant. A large number of blackish robber flies were preying on them and carrying the victims clasped between their legs. The moths were carried upside down, head foremost and clasped across the wings by the legs of the fly. The green of the *viridana* as it was being carried made the fly very conspicuous. Mr H. W. Andrews has identified the fly as *Neoitamus cyanurus*, Lw.

Several Dragonflies, *Libellula depressa*, L., were seen, both male and female, but the nearest permanent pond suitable for breeding was some half-mile away.

Snake Flies, Scorpion Flies and Wood-wasps were taken, and the red and black bug, *Triecphora sanguinolenta*, Geoff., was seen in fair numbers. It might be useful to record that during the winter of 1935 Mr S. Wakely found a mass of brown frothy matter like Cuckoo-spit in the fork of a Dock root at Ashtead. The froth contained a small grub which was passed on to Mr E. E. Syms, who bred it through, and it proved to be this insect. The amount of frothy matter produced by such a small grub was astonishing.

20th JUNE 1937.

FIELD MEETING—CUTT MILL.

Leader: Mr F. STANLEY-SMITH, F.R.E.S.

The Society was again fortunate in receiving an invitation to tea from our friend Mr Holford, F.R.E.S., of Elstead, and this enabled a second visit to be paid to the interesting but somewhat inaccessible country around the Cutt Mill Ponds.

Twelve members, with three visitors, accepted the invitation, but owing to the wet morning in London, only ten put in an appearance at Guildford Station. The weather, however, proved kind to the venturers, with weak sunshine most of the afternoon.

The party proceeded by private omnibus up on to the Hog's Back, then down through the village of Puttenham to the cross roads at Cutt Mill, where the 'bus was sent on to Elstead to wait till the evening. The party then started to work along the side of the smaller pond, but gradually dispersed, so that the various types of country were all

sampled during the day. On the whole the work was not so productive as last year, but a few species new to our record for the locality were captured or observed, and these are listed at the end of this report.

By 4.30 p.m. the party reassembled at the cross-roads, and walked by lane and the riverside path to Elstead to be received by Mr Holford and to enjoy a most welcome tea. Afterwards our host's gardens were explored. Our Secretary and his wife turned up at tea-time, and he seemed to make more captures in the paddock in half an hour than the rest of the party had made all day.

At 7.15 Mr Eagles moved a vote of thanks to Mr Holford, who replied that he derived great pleasure, as well as instruction, from meeting members, and hoped he would do so another year. The party then returned in the 'bus, via Shackleford, and the Guildford by-pass, to Guildford Station in time for the 8 o'clock trains.

List of species, taken or observed, other than those recorded last year:

LEPIDOPTERA:—(IMAGINES)—*Argynnis selene*, Schiff., *Plebejus argus*, L. (*aegon*, Schiff.), *Ochlodes venata*, Br. & Gry. (*Augiades sylvanus*, Esp.), ssp. *septentrionalis*, Verity, *Erastris pygarga*, Hufn. (*fasciana*, L.), *Lomaspilis marginata*, L., *Campaea* (*Metrocampa*) *margaritata*, L., *Semiothisa liturata*, Clrck., *Ematurga atomaria*, L., *Bupalus piniaria*, L., *Perconia strigillaria*, Hb., *Cedestis farinatella*, Dup., *C. gysseliniella*, Dup., *Argyresthia ephippella*, Fb., *A. cornella*, Fb., *Elachista luticomella*, Z., *Glyphipteryx thrasonella*, Scop. (LARVAE)—*Euchloë cardamines*, L., *Notodonta ziczac*, L., *Drepana lacertinaria*, L., *Scoliopteryx libatrix*, L., *Brephos parthenias*, L.

COLEOPTERA:—*Balaninus glandium*, Marsh.

ODONATA:—*Ischnura elegans*, Lind., *Aeshna* sp.

Birds heard included the Blackcap, Whitethroat, Sedge Warbler, Greenfinch, and Red-backed Shrike.

26th JUNE 1937.

FIELD MEETING—BOXHILL.

Leader: Mr F. D. COOTE, F.R.E.S.

The attendance at this meeting was much smaller than usual, consisting of 7 members and 2 visitors.

The morning party went from Boxhill Station by the field path across the meadows to Mickleham. Larvae of *Euchloë cardamines*, L., were noted, nearly full fed, and one example of *Perizoma flavofasciata*, Thun. (= *decolorata*, Hb.) was taken. From Mickleham members proceeded to the Juniper valley, via Headley Lane, confining activities to the lower part of the valley until returning to the Railway Hotel for tea. Afterwards a few members visited Ranmore Common, where they found young larvae of *Hemaris fuciformis*, L., on Honeysuckle. (Messrs Attwood and Ennis furnish the following note in regard to this larva—"It is easy to find when you know what to look for. The leaves are

eaten in little circular holes on each side of the midrib and the larva lies along the latter on the underside. Isolated bushes of Honeysuckle are most favoured.") Butterflies were scarce, though Juniper valley was very productive, as usual, with the "micros."

In addition to the Lepidoptera usually common at this time of year the following, besides those named above, were noted:—IMAGINES—*Harmodia (Dianthecia) lepida*, Esp. (*carpophaga*, Bkh.) (Boxhill Station), *Prothymnia viridaria*, Cl. (= *aenea*, Hb.), *Plusia chrysitis*, L., *Toxocampa pastinum*, Tr., *Cidaria fulvata*, Forst. (Ranmore Common), *Zygaena trifolii*, L., *Leptomeris ornata*, Scop., *Pempelia ornatella*, Schiff., *Pyrausta verbascalis*, Schiff., *Scoparia basistrigalis*, Knaggs, *Oxyptilus parvidactylus*, Haw., *Alucita tetradactyla*, L., *Marasmarcha phaeodactyla*, Hb., *Stenoptilia pterodactyla*, L., *Pandemis ribeana*, Hb., *Chlidonia subbaumanniana*, Wilk., *Phalonia tessarana*, Tr., *Cedestis gysselelli*, Dup., *Coleophora lizella*, Zell. (LARVAE)—*Sphinx ligustri*, L., *Smerinthus ocellatus*, L., *Cucullia verbasci*, L., *Lophopteryx camolina*, L. (Ranmore), *Lobophora viretata*, Hb., *Panolis griseo-variegata*, Göze (*pini-perda*, Panz.), *Eurhodope suavella*, Zinck.

The following notes and list in relation to other orders have been received:—

DIPTERA:—A large Tachinid observed attacking a larva of *Cimex sylvarum*, F. (Hymenoptera) which was found to have two Tachinid eggs on it. (*Phorocera assimilis*, Fall., teste C. J. Wainwright).

ORTHOPTERA:—*Ectobius lividus*, Fb. (Cockroach), a colony, young and mature under old newspaper. *Leptophyes punctatissima*, Bosc.

COLEOPTERA:—*Cionus hortulanus*, Marsh., on *Verbascum nigrum*. *Cryptocephalus hypochaeridis*, L., and *Oedemera lurida*, Marsh., on Hawkweed flowers, *Longitarsus exoletus*, L., on *Echium vulgare*, *Smicronyx reichii*, Gyll. *Cassida fastuosa*, Schall., eggs and larvae on *Inula conyza*. *Lina populi*, L., larvae swarming on young aspens.

Mr Attwood adds *Byturus tomentosus* (Coleoptera) and *Panorpa communis* (Mecoptera, Scorpion-fly).

4th JULY 1937.

FIELD MEETING—FOREST ROW.

Leaders: Mr S. WAKELY and Mr S. N. A. JACOBS.

Following an exceedingly hot Saturday this Sunday dawned cold and cloudy, but none the less some ten members, with guests, went to Forest Row by different routes and with varying success, but as the day drew on, although there was no appreciable breaking up of the clouds, it became warmer, and where the trees afforded shelter from the wind, collecting was pleasant and productive.

It was remarked that *Limenitis camilla*, L. (*sibilla*, L.), was not seen in its usual haunts and *Diacrisia sannio*, L. (*russula*, L.), was not in evidence, but it may be that the wind kept these insects down. A colony of

Plebeius aegon, Schiff. (*argus*, L.) was found at rest on the vegetation, and larvae of *Dicranura vinula*, L., and *Cerura bifida*, Hb., were found on the small aspen bushes, in various stages of growth.

Larvae of *Ancylis siculana*, Hb., were found on the buckthorn in some numbers, but mostly nearly full fed.

It was noted that, although not uncommon, *Tortrix viridana*, L., had not, this year, done any notable damage to the oak foliage in this locality, and was almost equalled in numbers by *T. loeflingiana*, L., which showed a marked range of variety, from very light to very dark ground with heavy marking. One specimen of *T. viburnana*, Fb., in very fine condition was taken.

The bog asphodel, *Narthecium ossifragum*, Huds., was in full bloom in the wetter places and made a very fine show; there were also patches of cotton grass (*Eriophorum* sp.) and sundew (*Drosera* sp.), but this last-named plant was certainly not so common as it had been in previous years.

One point that thrust itself forward was that in their wish to improve the grazing the local owners of grazing rights had burnt off the heather in parts, but had not troubled to get rid of the bracken, which has increased its area very noticeably and, if not taken in hand, will constitute a worse menace to the grazing than the heather ever was.

Among other species taken or noticed were:—

LEPIDOPTERA:—(IMAGINES)—*Aphantopus hyperantus*, L., *Lithocodia* (*Erastria*) *pygarga*, Hufn. (*fasciana*, L.), *Miana* (*Oligia*) *strigilis*, L., *Semiothisa notata*, L., *Cosymbia linearia*, Hb. (*trilinearia*, Brk.), *Eucosma corticana*, Hb., *Argyrotoxa bergmanniana*, L., *Gypsonoma dealbana*, Fröl., *Evetria buoliana*, Schiff., *Cedestis gysseleniella*, Dup., *C. farinata*, Dup., *Argyresthia goedartella*, L., *A. brockeella*, Hb., *Crambus pascuellus*, L., *Ocnerostoma piniariella*, Zell., *Borkhausenia unitella*, Hb., and *Gracillaria elongella*, L.

(LARVAE)—*Gonepteryx rhamni*, L., *Dicranura vinula*, L., *Pygaera pigra*, Hufn., *Panolis piniperda*, Panz., *Orgyia antiqua*, L., *Biston strataria*, Hufn., *Gonoptera libatrix*, L.

(OVA)—*Dicranura vinula*, L.

10th JULY 1937.

FIELD MEETING—SEAL CHART.

Leader: Mr F. D. COOTE, F.R.E.S.

Nine members and two visitors attended this meeting. Very few insects were noted on the wing, the day being showery with strong wind at times. A main road with considerable traffic cuts off the smaller part of the Chart. The dominant trees are small oaks and birches, with small clumps of aspen, beech and buckthorn. The undergrowth is mainly brake fern with a few small patches of heather and bilberry and occasionally cow-wheat.

COLEOPTERA:—Mr Attwood took *Elater balteatus*, L., and Dr Blair the Longicorn, *Leiopus nebulosus*, L., together with *Deporaius megacephalus*, Germ., which he states was one of the specialities of Darenth Wood in its more palmy days.

Dr Blair also furnishes the following notes:—

HYMENOPTERA:—The sawfly, *Pteronidea virescens*, Htg., and the Braconid, *Microdus rufipes*, Nees, for which Darenth Wood is the only British locality given by Marshall.

NEUROPTERA:—*Chrysopa ventralis*, Curt., was the best of the genus.

DIPTERA:—*Dioctria baumhaueri*, Mg., and *Myiotopa florea*, L.

Other members confined their attentions mainly to Lepidoptera, of which a fairly considerable variety of species was found in the larval stage, but only single or few specimens of each. The abundance of the wood ant probably accounted for the small numbers. A list of the insects taken or noted is appended. Of the following interesting species the larvae were met with: *Drymonia trepida*, Esp., *D. chaonia*, Hübn., *Acronicta leporina*, L., *Palimpsestis or*, F., *Ennomos erosaria*, Borkh., and *E. alniaria*, L.

An enjoyable tea was served at the Crown Hotel in Seal village.

The locality was quite new to those present and well worth further exploring.

Hylophila bicolorana, Fuessl., *H. prasinana*, L., *Sarrothripus revayana*, Scop. (*undulana*, Hb.), *Acronicta leporina*, L., *Monima incerta*, Hufn., *M. stabilis*, View., *M. gothica*, L., *Erastria pygarga*, Hufn. (*fasciana*, L.), *Orgyia antiqua*, L., *Dasychira pudibunda*, L., *Ptychopoda aversata*, L., *Hemithea aestivaria*, Hb. (*strigata*, Müll.), *Mysticoptera sexalata*, Retz., *Hydriomena furcata*, Thnbg. (*sordidata*, Fb.), *Euphyia silaceata*, Hb., *Semiothisa notata*, L., *Ectropis punctulata*, Schiff., *Biston strataria*, Hufn., *B. betularia*, L., *Cabera pusaria*, L., *Campaea margaritata*, L., *Plagodis dolabraria*, L., *Ennomos alniaria*, L., *E. erosaria*, Borkh., *Palimpsestis or*, Fb., *Drymonia (Notodonta) trepida*, Esp., *D. chaonia*, Hb., *Pterostoma palpina*, L., *Lophopteryx (Odontosia) camelina*, L., *Dicranura vinula*, L., *Phalera bucephala*, L., *Drepana fulcataria*, L., *Hepialus hectus*, L., *H. lupulinus*, L., *Maniola jurtina*, L., *Aphantopus hyperantus*, L., *Heodes phlaeas*, L., *Gonepteryx rhamni*, L., *Augiades sylvanus*, Esp. = *Ochlodes venata*, Brm. & Gry., of the R.E.S. List.

The following species have since been identified:—*Carcina quercana*, Fb., *Argyresthia goedartella*, L., and *Batodes angustiorana*, Haw.

18th JULY 1937.

FIELD MEETING—SOUTH BENFLEET, ESSEX.

Leader: Mr R. W. ATTWOOD.

Thirteen members and two visitors attended. The weather was dull with bursts of sunshine.

A few of the party proceeded to Hadleigh and in spite of the short time spent there managed to acquire a considerable number of species among which were *Thecla quercus*, L., *Maniola* (*Epinephele*) *tithonus*, L., *Aphantopus hyperantus*, L., *Cybosia mesomella*, L., and *Miltochrista miniata*, Frst. *Melitaea athalia*, Rott., was nearly over and very worn but it was possible to select a few in fair condition. The Ant, *Formica rufa*, L., was very abundant and a Tabanid Fly was rather troublesome to some of the members.

The visit here was short and a return was made to the rest of the party who had gone through the disused railway siding to the sea wall. Here *Pamphila lineola*, Ochs., was plentiful with a sprinkling of *Satyrus* (*Melanargia*) *galathea*, L., and *Pamphila sylvanus*, Esp. = *Ochlodes venata*, Brm. & Gry., of the R.E.S. List.

The Micro-lepidoptera were abundant hereabouts and on the sea marshes and a number of local species were taken. The larvae of *Euchloris smaragdaria*, Fb., were taken on the Sea Wormwood but were very small.

After lunch several of the members worked the rough hillside and reported that *Satyrus galathea*, *A. hyperantus* and *E. tithonus* were plentiful and in good condition. *Vanessa c-album*, L., and *Thecla w-album*, Knoch, were also taken.

The Dragonflies noted were *Lestes dryas*, Krby., *Anax imperator*, Leach, *L. sponsa*, Hans., *Ischnura elegans*, Lind., *Libellula depressa*, L., *Sympetrum scoticum*, Don., and *Sympetrum sanguineum*, Müll., and what appeared to be *Orthetrum coerulescens*, F., was seen.

The Grasshoppers appeared to be less plentiful than usual and more backward for the time of the year as they were mostly immature. The local species, *Metrioptera roeselii*, Hagn., and *Conocephalus dorsalis*, Latr., were taken and *Phasgonura viridissima*, L., was seen; a yellow form of *Chorthippus elegans*, Charp., was mature.

Mines of *Lithocolletis quercifoliella*, Zell., many of the larvae being parasitised by an Encyrtid, and larvae of the "Palisade" Sawfly, *Lygaeonematus compressicornis*, F., were found on Aspen at Hadleigh. At South Benfleet the beetle, *Leptura livida*, F., was taken, and galls of *Mecinus collaris*, Germ., on flower stalks of *Plantago maritima*. Only one beetle was obtained from two or three dozen galls, the larvae having been mostly parasitised by a Chalcid, *Micromelus pyrrhogaster*, Wlkr., of which the solitary black pupa was in the galls. The flies from these are not due out until next year.

Among Diptera were *Chilosia intonsa*, Lw., *Chrysotoxum bicinctum*, L., *C. cautum*, Harr., *Nemotelus uliginosus*, L., and *Ceroxys pictus*, Mg.

The London Natural History Society were holding a Field Meeting at Benfleet at the same time and it was interesting to compare notes with their members. Tea was taken in the Hoy Inn.

In addition to those mentioned above, the following species of Lepidoptera not included in previous reports from this locality, were noted: *Maniola jurtina*, L., *Coenonympha pamphilus*, L., *Polygonia c-album*,

L., *Gonepteryx rhamni*, *L.*, *Amorpha populi*, *L.* (larvae), *Dicranura vinula*, *L.* (larvae), *Cosmotriche (Odonestis) potatoria*, *L.* (ova), *Nygmia (Euproctis) phaeorrhoea*, *Haw.*, *Drepana falcataria*, *L.* (larvae), *Sarothrips revayana*, *Scop.* (cocoon), *Acrionicta psi*, *L.*, *Metachrostis (Bryophila) perla*, *Fab.*, *Sideridis (Aletia) comma*, *L.*, *Pseudoterpna pruinata*, *Hufn.*, *Acidalia immutata*, *L.*, *Chiasma clathrata*, *L.*, *Evergestis (Endotricha) flammealis*, *Schiff.*, *Loxostege (Spilodes) palealis*, *Schiff.*, *Hemimene questionana*, *Z.*, *Eucosma aemulana*, *Schläg.*, *Phalonia dubitana*, *Hb.*, *P. affinitana*, *Doug.*, *P. vectisana*, *Westw.*, *Euxanthus angustana*, *Hb.*, *E. zoegana*, *L.*, *Lozopera beatricella*, *Wals.*, and *Metzneria lapella*, *L.*

24th JULY 1937.

FIELD MEETING—BYFLEET.

Leader: Mr C. N. HAWKINS, F.R.E.S.

Once again a visit to this well-known locality proved extremely interesting and, as it was favoured by fine and warm weather, it was also most enjoyable. Eleven members and one visitor attended and a number of noteworthy captures and observations were made. The usual route was followed, towards Weybridge in the morning and towards Woking in the afternoon. In the morning it was found that much of the marsh-land adjoining the canal, which used to be easily workable and often productive, was now very much overgrown with a dense tangle of more than head-high birch, aspen, willow, etc., so that most of the collecting in this direction was, perforce, confined to the canal bank and a few small clearings. Nevertheless it was along this stretch that, thanks to Dr Cockayne, the most interesting Lepidopterous discovery, or re-discovery, was made. It had been noted on previous occasions, that the Great Yellow Loosestrife, *Lysimachia vulgaris*, *L.*, grew freely in places here, and, knowing that *Collix sparsata*, *Fr.*, a very local Geometrid moth whose larva feeds upon it, had been recorded for Surrey (though this is not mentioned in "South" nor in any other of the usual books of reference) he had always considered Byfleet a very likely locality. Previous efforts to obtain the species there, however, had invariably failed to produce it, but on this occasion he was soon rewarded by beating out some larvae from plants growing on the canal bank, and subsequently he, and several other members, obtained a considerable number of them. The larvae were of all sizes, from very small to full-grown, and there were plentiful signs of eating on plants which produced no, or only one or two, larvae so that it seems probable that a good many had already pupated.

The Society has visited Byfleet on several occasions in recent years at about this date without coming across this species, but possibly it is having an exceptionally good year or the season for it this year coincided better with the date of the meeting.

Other interesting Lepidoptera taken included several larvae of *Drymonia trimacula*, *Esp.* (which also seems to be having a good year), two

larvae of *Stauropus fagi*, L. (both from oak), and a young larva of *Gastropacha quercifolia*, L.

One member obtained a number of examples of the Fish-Louse, *Argulus foliaceus*, L., from minnows in the canal.

A very welcome tea was taken at the "Green Tea Rooms" near Byfleet Station at about 6 o'clock, after which members dispersed to their respective homes.

Full lists of the species reported as having been taken or observed are appended:—

Dr Blair, Canal side:—

LEPIDOPTERA:—*Smerinthus ocellatus*, L., larvae on small willow overhanging the water, *Palimpsestis* (*Cymatophora*) *or*, F., on aspen, *Chloroclysta miata*, L., larva on hazel, *Endotricha flammealis*, Schiff. A cocoon of *Malacosoma neustria*, L., spun in an aspen leaf contained two Tachinid puparia beside the shrivelled larva.

COLEOPTERA:—*Donacia bicolora*, Zsch., *D. simplex*, F., *D. semicuprea*, Pz., *D. marginata*, Hoppe, and *D. cinerea*, Hbst. The local *Phyllobrotica quadrimaculata*, L., on skullcap, *Phytodecta rufipes*, De G., on aspen, *Orchestes stigma*, Germ., and *Nanophyes lythri*, F., on the purple loosestrife.

ODONATA:—*Aeshna grandis* L., was the most prominent species, though *Somatochlora metallica*, Lind., was taken and *Ischnura elegans*, Lind., was plentiful.

TRICHOPTERA:—The only Caddisflies noted were *Mystacides nigra*, L., and *Oecetis lacustris*, Pict.

NEUROPTERA:—*Sisyra fuscata*, F., of which the larvae live in the freshwater sponge.

HYMENOPTERA:—*Poecilosoma luteolum*, Kl., and its larva were swept from the great yellow loosestrife as well as the larvae of *Athalia scutellariae*, Linn., on skullcap.

DIPTERA:—Included *Dexia rustica*, F., swept from the waterside vegetation, and *Loxocera albiseta*, Schrk.

The Heath:—

LEPIDOPTERA:—*Plebejus argus*, L. (*aegon*, Schiff.), *Anarta myrtilli*, L., *Lygris* (*Eustroma*) *testata*, L., *Crambus pascuellus*, L., and a bunch of ova of *Macrothylacia rubi*, L., which had produced the usual parasites.

COLEOPTERA:—The best capture was a single specimen of *Balaninus cerasorum*, Hbst., from birch; *Cryptophagus lycoperdi*, Scop. was in its usual fungus.

ODONATA:—*Orthetrum coerulescens*, F., 1 ♀ captured, and a ♀ of *Pyrrhosoma nymphula*, Sulz., was also seen.

ORTHOPTERA:—*Metrioptera brachyptera*, L., was just becoming mature among the heather.

HYMENOPTERA:—A sandy mound of only a few yards in extent produced quite an interesting assemblage of Hymenoptera. The most con-

spicuous was *Cerceris arenaria*, L., the females of which were bringing large weevils, mainly *Otiorrhynchus singularis*, L., to their burrows, but *C. rybyensis*, L., was also present as well as *Saropoda bimaculata*, Pz., *Crabro scutellatus*, Schev., one of which was almost without the usual yellow markings on the abdomen, *Mimesa bicolor*, F., *Diodontus minutus*, F., and a single ♂ of *Myrmosa melanocephala*, F. The Tachinid, *Metopia leucocephala*, Rossi, was an interested looker-on.

DIPTERA:—Over the heather *Micropalpus vulpinus*, Fln., was not uncommon, and *Sericomyia borealis*, Fln., *Xylota sylvarum*, L., and *X. segnis*, L., were also taken.

Mr Ashby reported the following additional species:—

COLEOPTERA:—*Synharmonia conglobata*, L., *Ditoma crenata*, F., *Silvanus unidentatus*, F., *Galerucella lineola*, F., *Sitona crinitus*, Hb., *Orchestes avellanae*, Do., *Nanophyes marmoratus*, Gz.

Mr Wakely reported:—

LEPIDOPTERA:—*Xanthoecia* (*Gortyna*, *Ochria*) *flavago*, Schiff. (*ochracea*, Hb.), larva in thistle stem, *Evergestes straminealis*, Hb., *Crambus uliginosellus*, Zell., *Pyrausta verbascalis*, Schiff., *Eucosma solandriana*, L., *Ancylis siculana*, Hb., *Choreutis myllerana*, F. (larvae on Skullcap, *Scutellaria galericulata*) and *Tinea corticella*, Curt.

He adds:—"The *C. uliginosellus* was new to me; it was swarming among heather (wet place) but thinking it was something else, only took three."

Mr Attwood reported:—

LEPIDOPTERA:—*Pararge megera*, L., *Maniola tithonus*, L., *M. jurtina*, L., *Aphantopus hyperantus*, L., *Heodes* (*Chrysophanus*) *phlaeas*, L., *Pieris brassicae*, L., *P. rapae*, L., *Adopoea sylvestris*, Poda (= *Pamphila thaumas*, Hufn.), *Pygaera pigra*, Hufn., *Phytometra* (*Plusia*) *gamma*, L., *Gonospileia* (*Euclidia*) *mi*, Clerck, *Chilo phragmitellus*, Hb., *Carcina quercana*, Fb., *Cataclysta lemnata*, L., and *Hydrocampa nymphaea*, L.

The Leader also noted, or received notes of:—*Nymphalis io*, L. (seen), *Limenitis camilla*, L. (*sibilla*, L.) (seen), *Pergesa* (*Chaerocampa*) *elpenor*, L. (very small larvae on *Galium*), *Cerura furcula*, L. (larvae), *Acronicta leporina*, L. (larva), *Lithosia griseola*, Hb. (numbers of imagines, but with one doubtful exception seen, no examples of the yellow var. *stramineola*, Dbld.), *Rivulus sericealis*, Scop. (imagines) and *Cosymbia* (*Zonosoma*) *punctaria*, L. (larvae).

15th AUGUST 1937.

FIELD MEETING—EYNSFORD.

Leader: Mr S. N. A. JACOBS.

About one dozen members met at Eynsford station about 11 o'clock and set off along the Shoreham road, taking the footpath at the top of

the Railway cutting where this was passable. "Blues" and the "Small Copper" were present in numbers sunning themselves on the side of the cutting, and *Blastobasis lignea*, Wals., was disturbed from the Yew trees.

The party proceeded to the second bridge, and then climbed the hill, by which time it was well past mid-day, and a halt was called for lunch. After lunch it was the intention to take the path through the woods on the hill-top making the circuit to the gun-testing range, and thus back to Eynsford for tea. Part of the members, however, mistook the path and continued towards Shoreham, but as they seem to have made quite a good bag, no harm was done.

The big Asilid fly, *Asilus crabroniformis*, L., was in evidence, and on the hillside, the "Silver Spotted Skipper" was plentiful, and *B. lignea*, Wals., was taken in these woods at rest on tree trunks. These were somewhat worn, and the absence of Yew in the immediate vicinity argues that these specimens had sheltered there, probably having been driven some distance by wind. The species is reasonably common in the yew trees above the old gun-testing range, across the valley, but the yew trees do not appear on the west side of the valley.

Captures reported were according to the attached lists.

COLEOPTERA:—*Cryptocephalus pusillus*, Fb., *Chaetocnema concinna*, Marsh., *Psylliodes cuprea*, Koch, *Strophosomus capitatus*, De G., *Phyllotreta vittula*, Rdt., *Cassida rubiginosa*, Müll., *Sphaeroderma rubidum*, Grls., *Coccinella 11-punctata*, L., *Malthinus fasciatus*, Ol., *Aleochara curtula*, Gze., *Abax ater*, Vill., *Amara communis*, Pz., *Salpingus castaneus*, Pz., *Bradycellus verbasci*, Dft., *Staphylinus ater*, Gr., *Oxytelus inustus*, Gr., *Ophonus pubescens*, Ml., *Pterostichus vulgaris*, L., *Calathus fuscipes*, Gz., *Agonum dorsalis*, Pp., *Demetrias atricapillus*, L., *Dromius linearis*, Ol., *Adalia 10-punctata*, L., *Coccinella 7-punctata*, L., *Calvia 14-guttata*, L., *Thea 22-punctata*, L., *Rhizobius litura*, F., *Onthophagus ovatus*, L., *Cryptocephalus labiatus*, L., *Sermyla halensis*, L., *Phyllotreta undulata*, Kt., *Psylliodes chalconera*, Il., *Apion nigritarse*, K., *A. pisi*, Fb., *A. flavipes*, Pk., *A. hookeri*, K., *A. onopordi*, Krby., *A. aestivum*, Gm., *A. carduorum*, K., *Strophosomus melanogrammus*, Fo., *Anthonomus rubi*, Hb., *Ceuthorrhynchus pollinarius*, Fo., *Orchestes rusci*, Hb., *Phyllotreta nigripes*, Fb., *P. consobrina*, Ct., *Longitarsus gracilis*, Kt., *Galerucella viburni*, Pk., on *Viburnum*; *Orchestes avellanae*, Don, on oak; *Aphidecta oblitterata*, L., with black legged variety, on spruce; *Ochina ptinoides*, Marsh, by beating old ivy on bush; *Scymnus capitatus*, F., on oak; *Harpalus latus*, L., at roots of *Lotus corniculatus*; *Aphthona venustula*, from *Euphorbia*, and *Liparus coronatus*, Göze.

HETEROPTERA:—*Malacocoris chlorizans*, Fall., *Phylus coryli*, L., var. *avellanae*, H.S., *Derephysia foliacea*, Fall., *Triphleps niger*, Wolff., *Myrmus miriformis*, Fall.

HOMOPTERA:—*Agallia venosa*, Fall., *Eupelix cuspidatus*, Fb., *Batracomorphus lanio*, L.

27th AUGUST 1937.

FIELD MEETING—BOXHILL.

Leader: Mr S. WAKELY.

No doubt the holiday season caused the attendance at this meeting to be less in number than it would otherwise have been, yet about a dozen members had an enjoyable day's collecting in fine weather. Mr Coote took charge of the morning party, and Juniper Valley and surrounding slopes were well explored. The larvae of *Hylophila prasinana*, L., were particularly common on beech, together with *Cosymbia* (*Leucophthalmia*) *linearia*, Hb.; *Colocasia coryli*, L., larvae were more scarce than usual in this locality.

After lunch, the party worked their way to the top of the hill, eventually descending by the slippery path to the stepping-stones over the River Mole, which some of the party negotiated with difficulty. Tea was partaken of at the Railway Hotel, after which some of the members returned to the southern slopes of Boxhill and were successful in finding *Polyommatus* (*Lycaena*) *bellargus*, Rott. Some fine plants of Soapwort (*Saponaria officinalis*, L.) which were in full bloom on a bank near the station were much admired, and a number of plants of the balsam, *Impatiens noli-me-tangere*, L., were also seen nearby. The curious and rather startling manner in which the seed-pods burst open when touched was commented on.

Mr Attwood reported the two Orchids, *Listera ovata*, Br. (The Tway-blade) and *Spiranthes autumnalis*, Rich. (Lady's Tresses).

A list of other species recorded is as follows:—

ORTHOPTERA:—*Meconema thalassina*, De Geer, *Leptophyes punctatissima*, Bosc., *Myrmeleotettix maculatus*, Thnbg.

COLEOPTERA:—*Galerucella viburni*, Pk., *Paederus riparius*, L., *Polydrosus pterygomalis*, Sch., *Haltica oleracea*, L., *Pyropterus affinis*, Pk., *Longitarsus luridus*, Scop., *Hermaeophaga mercurialis*, F., *Timarcha coriaria*, Laich., *Platystethus arenarius*, Frcry., *Apion nigritarse*, Kirb., *Cassida rubiginosa*, Müll., *Aphidecta oblitterata*, L., *Calvia 14-guttata*, L., *Anatis ocellata*, L., *Byturus aestivus*, L.

LEPIDOPTERA:—(Imagines)—*Eumenis* (*Satyrus*) *semele*, L., *Polyommatus icarus*, Rott., *Pamphila* [*Hesperia* ?] *comma*, L., *Plusia gamma*, L., *Sarothrips revayana*, Tr., *Xanthorhoe designata*, Hufn., *Anaitis plagiata*, L., *A. efformata*, Gn., *Aspitates gilvaria*, Schiff., *Eucosma solandriana*, L., *Lathronympha hypericana*, Hb., *Gracillaria semifascia*, Hw.

(Larvae)—*Atolmis* (*Gnophria*) *rubricollis*, L., *Acronicta ligustri*, Fb., *Dasychira pudibunda*, L., *Leucophthalmia punctaria*, L., *Biston betularius*, L., *Campaea* (*Metrocampa*) *margaritata*, L., *Drepana lacertinaria*, L., *D. falcataria*, L.

HEMIPTERA:—*Palomena prasina*, L., *Ledra aurita*, L., *Elasmotethus griseus*, L.

12th SEPTEMBER 1937.
FIELD MEETING—WESTERHAM.

Leader: Mr S. N. A. JACOBS.

There was quite a good attendance at this meeting and the party split up to work the various parts of Limpsfield Chart. The collection of autumn Lepidopterous larvae was the major consideration of the meeting, but there were members who also busied themselves with Coleoptera, Hymenoptera, and other orders.

Larvae of *Myelois neophanes*, Durr., were sought and found in the fungus, *Daldinia concentrica*, growing on dead birch trees, and a good selection of the usual autumnal Lepidopterous larvae fell to the lot of most beaters.

Tea was taken at Pitt's Cottage by some twelve members and the party dissolved, some going back for evening work, while others took their several ways home after an enjoyable day in this very beautiful piece of woodland.

There were no outstanding captures to report, though larvae were reasonably plentiful.

ANNUAL ADDRESS TO THE MEMBERS

OF THE

South London Entomological and Natural History Society.

Read 27th January 1938

By F. J. COULSON, President.

LADIES AND GENTLEMEN,—The Report of the Treasurer and the Council's Report which have just been read indicate that the Society still maintains the high standard of previous years and continues to progress in achievement and usefulness in the sphere of the activities which occasioned its formation in 1872. The value of the increasing membership is enhanced by the accession of enthusiasts paying attention to the lesser known orders. The financial position of the Society is, as you have heard, very satisfactory. The ordinary meetings have been well attended and the exhibits made have been both interesting and varied. The record attendance of members and visitors at the Annual Exhibition shows that the value of this function is well recognised. A number of exceptionally interesting papers on varied subjects have been read during the past year and a film presented by Dr Hewer was a revelation not only as regards the subject matter but as to the possibilities of scientific presentment by this means. The discussions at the meetings proved of great interest and I trust that members both collectively and individually will continue to appreciate fully the value of development in this direction.

The opportunities for observations and collecting at the numerous field meetings held during the past year and the detailed reports in this connection will enhance the value of the Proceedings, and it is desirable that with this object in view members will ensure adequate details are given when exhibits are made.

Full advantage of the facilities afforded by the library of the Society was taken by the members during the year, and it is hoped that the shelves may be enriched at a future date by works consequent upon their special studies.

It is regretted that during the past year the Society has lost by death one Life member and four Ordinary members. The first, the Right Hon. Lord Rothschild, joined the Society in 1920 and during his membership has on many occasions exhibited at our Annual Meetings selections from his wonderful collection of Lepidoptera.

Of the four members, Mr T. W. Hall joined the Society as a Lepidopterist in 1884, was President in 1895, and for many years held the post of Treasurer to the Society. Mr R. A. Adkin, whose speciality

was Mollusca, joined the Society in 1901 but was not a frequent visitor to the meetings during recent years owing to illness. Mr J. H. Rowntree, of Scarborough, who was a member since 1890, and Mr J. H. Walker, since 1927, were both devoted to the study of Lepidoptera.

Two members of the Society have been honoured by His Majesty during my term of office, Prof. Sir H. Beckwith Whitehouse and Capt. A. F. Hemming, C.M.G.

This concludes my introductory remarks and I now turn to the main part of my address, which deals with a study of the secondary sexual characters of British Coleoptera.

A STUDY OF THE SECONDARY SEXUAL CHARACTERS IN BRITISH COLEOPTERA.

In the study of British Coleoptera a feature of great interest to the advanced student and a source of difficulty to the tyro is met in the sexual structural differences. Some of these are very striking and the sexes are widely different in appearance. In a large number of instances, however, they are of a minor character and in many the difference between the sexes, apart from the genitalia, can be appreciated only by close comparison. The parts affected differ in individual species, but in some genera the sexual differences are confined to the same part.

The examination of the genitalia for the determination of closely allied species has received much attention and it is not proposed to deal with this specialised section, but to direct attention to the differences apart from the genitalia. The presence of these points of difference not only enables the sexes of individual species in collections to be selected with exactitude, but, apart from the aid in connection with the separation of the males of closely allied species, gives valuable assistance for the accurate isolation of the females. The investigation of these characters is therefore of practical importance as it enhances the utility of the collection made by minimising possible errors in the determination of species. In addition, the study is one of great interest. It is by the close examination of the specimens secured that we advance our knowledge for use in the field and ensure accurate records being made.

The structural differences between the species of a genus and the characters upon which the separation of the genera is determined does not come within the scope of this study. I exhibit the material upon which my remarks are based and have drawn attention to particular features.

The examination of the under surface is a tedious process as it involves usually the removal of the specimen from the card, but it is desirable that the under surface of both sexes should be shown in one's series.

There are species of Coleoptera which present so wide a difference of structure between the sexes that the sexes appear to be specifically distinct. These dimorphic forms upon analysis show no feature distinct

from the minor differences in many other sexually differing species. *Ptinus fur*, L., the well-known pest on furs and skins, differs in the sexes both in colour and shape, as well as in the colour pattern, length of antennae and in some other respects. The slender frame of male *Lagria hirta*, L., is a wide contrast to the bulky appearance of the females. Differences in colouring in some species, as in *Dascillus cervinus*, L., *Denticollis lineare*, L., and *Osphya bipunctata*, L., tend superficially to confuse the determination. The difference of the shape of the thoraces of the sexes in *Athous longicollis*, Ol., and the rarity of the female is liable with the tyro to cause the representative series in the collection to be masculine and the feminine examples to be included under another species which it superficially resembles, *Athous villosus*, Fourc. But the widest divergences in the sexes occur in *Lampyris noctiluca*, L., and *Drilus flavescens*, Geoff., in which the females are wingless.

Slight differences of general shape in the sexes, although not a strong feature, are sometimes an aid to determination. In the oval species of *Ptenidium* and *Olibrus* a slight difference is evident upon comparison, but no great reliance can be placed on this distinction. The relative breadth of some species as *Cteniopus flavus*, L., *Sericus brunneus*, L., and *Omophlus rufitarsis*, Leske, in respect of which the males are narrower, and in the *Gyrinidae* the relative length are of great utility in the determination. The more parallel shape of the elytra in the males of some others, as *Rhagonycha* species and *Psilotrix cyaneus*, Ol., is also valuable. The females in these cases have the elytra more dilated towards the anal portion. A combination of this feature with a greater convexity of the anal end will aid to the separation of many females in the species of the subdivision Rhynchophora. The proportionate width of the head to the thorax is sometimes reliable. The comparative size of the entire insect is unreliable in many instances as an aid to the determination, but of great assistance in others.

The examination of the mouth parts reveals in many species structural differences between the sexes. The large mandibles of the male of *Lucanus cervus*, L., and *Dorcus parallelipedus*, L., are well known. In *Gnathocerus cornutus*, L., the mandibles of the male are each produced into a tooth, whilst in *Siagonum quadricorne*, Kirb., there is a curved tooth on each mandible of the male. Points of difference in the clypeus occur. *Micropeplus fulvus*, Er., and *M. staphylinoides*, Marsh, have the clypeus pointed in the males and in varying degrees the male clypeus is sinuate in certain species of *Cis*, as *C. nitidus*, Herbst, and *C. lineotocibratus*, Mel. Differences in the colour of the clypeus is the means of separation in *Philhydrus frontalis*, Er. The rare *Limexylon navale*, L., affords a good instance of peculiar masculine maxillary palpi. In the head the presence of tubercles, pointed or blunt teeth, or horns, long or short, curved or straight or comparatively raised margins indicate in certain species the masculine examples. The males of *Aphodius* have the middle tubercles on the forehead normally larger than the females but the degree of the development of the tubercles differs con-

siderably in individuals. *Bledius furcatus*, Ol., *B. spectabilis*, Kr., and *tricornis*, Herbst, have pointed tubercles well developed near the eyes in the males, and several other members of the *Bledius* genus have representative tubercles in the same position. A raised transverse margin in the front of the eyes occurs in males of *Onthophagus ovatus*, L. Teeth on both sides of the forehead occur in males of *Platystethus cornutus*, Grav., and *alutaceus*, Thoms., and also in the two species of *Ennearthron* and their near relative, *Rhopalodontus fronticornis*, Pz. Long teeth also exist on the forehead of the male of *Anthophagus alpinus*, F., and blunt teeth on the front of the head of *Cis bidentatus*, Ol.

In *Onthophagus* genus the males have a long curved horn at the back of the head and *Batrises adnexus*, Hmp., a thin bent horn. In the rare *Copris lunaris*, L., the horns are a feature of both sexes, but that of the male is relatively longer. The rare *Odontaeus armiger*, Scop., has also long horns on the head of the male whilst in *Sinodendron cylindricum*, L., the vertex of the head is produced.

The relative convexity of the eyes of the sexes and their comparative size are often a useful guide. In *Antherophagus* the males have less convex eyes, and in the genera *Oxytelus* and *Malthodes* the eyes are larger in the masculine sex.

As regards the rostrum, the apical half of that of the males of *Apion nigritarse*, Kirb., and *A. rufirostre*, F., is yellow, and red in *Balanobius pyrrhocerus*, L. In the *Apion* genus generally that of the male is broader and shorter than that of the female. Puncturation of the part of the rostrum in front of the point of the insertion of the antennae will distinguish the male of *Cionus hortulanus*, Geof., but the allied *C. thapsi*, F., has this character in both sexes.

In many species the head of the male is broader and larger than that of the female—broader in *Laemophloeus*, most of the *Gabrieus* species and in *Philonthus*, larger in *Agaricophagus* and *Haploderus* and both broader and larger in *Oxytelus*.

The formation of the antennae in Coleoptera, as in Lepidoptera, is an important factor in the differentiation of the sexes. In *Anoncodes melanura*, L., twelve joints are present in the male and eleven in the female. Antennae are often pectinate in the male sex, as in *Drilus flavescens*, Geof., *Metoeus paradoxus*, L., and *Ptilinus pectinicornis*, L. The female antennae of the latter are serrate. In *Gonodera ceramoides*, L., both sexes have serrate antennae but the individual serrations are longer in the male. Whether the antenna is a scent organ, or a wire-less aerial, or not, a definite purpose undoubtedly is served by the variations which evidence the sex, and it is reasonable to suppose that the other differences that characterise the sexes have a purpose, although the purpose may not be definitely ascertained. The relative lengths of the antennal joints determine the antennal lengths both in species and the sexes, but in a fair number of instances the antennae are longer in the masculine sex than in the feminine. This occurs in the species *Gonodera lupurus*, Herbst, and *G. murinus*, L., *Omapthus rufitarsis*,

Leske, *Sitaris muralis*, Forst., in the *Laemophloeus* genus and in the *Lycidae*. On the other hand the female antennae of *Platystomus albinus*, L., are longer than that of the male.

Individual joints of the antennae present many characteristic features. The club lamellae are longer in the male of *Serica brunnea*, L., the last joint very elongate in *Lagria hirta*, L., and joint 11 longer in the *Bryocharis* genus. The enlarged joint 10 in the male *Callicerus obscurus*, Gr., the elongate masculine and quadrate feminine joint 10 in *Bryaxis longicornis*, Leach, and the quadrate masculine and transverse feminine joint 10 of *Semiris rigidicornis*, Er., serve to separate the sexes. Joint 5 is enlarged in the male of *Tychius niger*, Pk., joint 4 in *Phyllotreta nodicornis*, Marsh, and joints 4 and 5 dilated in the males of certain other species of *Phyllotreta*, whilst joints 6 and 7 are compressed in males of *Meloë* species. In *Hylophilus pygmaeus*, De G., joints 6 to 10 are elongate in the male, thereby extending the antennal length. Joint 9 of the masculine *Euconnus denticornis*, Müll., has a tooth on the underside and joint 2 of masculine *Bythinus curtisi*, Leach, possesses a small tubercle on the inner side, which in *Bythinus macropalpus*, Curt., male, has a sharp edge. In the genus *Helodes* the masculine antennae are thicker than those of the female, and pubescent. These are but a few of the many aids to the differentiation of the sexes which the antennae present.

As in the head, the thorax in many cases gives assistance for the determination of the sexes by the presence of teeth, horns or spines. Two teeth are present on the front margin of the thorax of *Ennearthron cornutum*, Gyll., and *Rhopalodontus fronticornis*, Pz., and, on each side in front, *Rhynchites betulae*, F., and *R. populi*, L., a long spine. In *Bledius spectabilis*, Kr., *B. furcatus*, Ol., and *B. unicornis*, Germ., long teeth occur on the frontal portion of the thorax and in *Ceratophylus typhoeus*, L., and *Odontaeus armiger*, Scop., long horns are present.

Other assistance is also afforded by the thoraces. In *Serica brunnea*, L., the front angles are sharper in the female. The frontal margin in the male of *Aphodius foetens*, F., has a depression. The relative elongation of the thorax gives a clue to the sexes of *Obrium cantharinum*, L., and *Gracilia minuta*, L. In *Silis ruficollis*, F., the thorax is strongly emarginate before the hind angles in the male. The female *Stenostola ferrea*, Schr., alone possesses patches of white pubescence on the thorax. Colour differences, usually a bad guide in Coleoptera, occur in the sexes of *Mordellistena abdominalis*, F., *Cryptocephalus coryli*, L., and *Leptura melanura*, L.

Compared with the thorax the elytra, apart from the general shape as an aid to differentiation, have few distinctive masculine features. In the female elytra of *Anthobium minutum*, F., and *A. torquatum*, Marsh, *Thanatophilus dispar*, Herbst, *T. sinuatus*, F., and *Pterostichus anthracinus*, Ill., the sutural angle is produced. Certain species of *Bolitochara* have a raised keel parallel to the suture in the males. *Pachygluta ruficollis*, Er., has a raised prominence on each elytron near the suture

in the male and *Sipalia circellaris*, Gr., a tubercle on each near the scutellum. The rare *Brachida notha*, Heer, has also a tubercle on each male elytron near the sutural angle.

The individual segments of the abdomen both as regards the upper and lower surfaces possess in numerous instances valuable secondary sexual characters. The facility for examination given by the exposed segments as in the Subdivision Brachelytra, has resulted in a fund of information being accumulated. In the *Atheta* group particularly accurate determination of these small species in a large number of instances can be assured by reliance on these characters. The main characters on the upper surface are the presence of tubercles, keels, depressions on certain segments, and emarginations or sinuations of the last (or anal) segment. But the sexual differences on the under surface of the last segments, particularly the final, are invaluable for the purpose of sexual determination.

Tubercles may be present in male specimens on the upper surface of most of the segments but the last segment is usually that upon which granulations are most numerous. Thus in *Liogluta longiuscula*, Gr., and *Semiris rigidicornis*, Er., there is a tubercle on the first segment. *Thectura cuspidata*, Er., has a tubercle on each side of segments 2 and 3. *Homalota plana*, Gyll., has one tubercle on segment 5 but on many of the small Brachelytrids segments 5 and the last bear numerous tubercles or granulations.

A longitudinal keel occurs on segment 5 of the male abdomen in *Pachygluta ruficollis*, Er., the rare *Leptusa angusta*, Aub., and in certain species of *Bolitochara*. The common *Leptusa haemorrhoidalis*, Heer, possesses, however, one small tubercle on that segment. A fovea, or depression, occurs on segment 3 of *Myrmoeccia plicata*, Er., angular in shape, whilst in *Brachygluta helferi*, Sch., a U-shaped impression occurs near the hind margin of segment 1.

The presence of emarginations on the upper surface of the last segment is of immense value for the determination of sex in such genera as *Tachinus*, *Gyrophæna*, etc., and many small Brachelytrid genera, and the differences observable as regards the anal plate of the under surface are of equal importance. The last ventral segment in the genera *Ilybius* and *Agabus* possesses many features upon which the separation can be effected and generally speaking the examination of the under side characters, although more arduous, would well repay the labour spent. In one genus, *Anaspis*, the peculiar male appendages beneath the abdomen are invaluable in the separation of the closely related species.

The limbs of male Coleoptera in numerous cases possess reliable characters by which the sex can be determined and as they are easily examined a fund of information is available. In certain *Choleva* species the trochanters have features which enable not only the sexes to be determined but enable closely allied species to be accurately separated. The strongly thickened legs of male *Bibloporus bicolor*, Den., and *Bythinus puncticollis*, Den., are very striking to the eye, although the species

in question are small. In numerous widely separated species the hind femur in the male sex is dilated, e.g., *Rhynchites betulae*, L., *Stenus juno*, F., *Megarthus denticollis*, Beck., *Cyrtusa pauxilla*, Schm., *Necrodes littoralis*, L., *Oedemera nobilis*, Scop., and *Euplectus piceus*, Mots. Sharp teeth are present in the male on the femora in many cases and when teeth are possessed by both sexes, those of the female are often smaller in comparison or less in number. *Hydrobius strigosus*, Sch., and *Cyrtusa minuta*, Ahr., possess one tooth on each femur, whilst two are possessed by *Colenis immunda*, Stm. In *Donacia crassipes*, F., and *D. versicolora*, Brahm, the male possesses two as against one possessed by the female. Usually the teeth are placed in the centre but often they are situated at the apex. In other species lobes on the hind femora afford a means of distinction. The front femur is not of equal importance, but in *Stenichnus pusillus*, Müll., and *S. scutellaris*, Müll., an angled condition at the apex will distinguish the male sex.

Masculine characters on the tibiae may be present on any of the three and they take forms which may be described as teeth or spurs, excavations, bends, emarginations or even angled conditions. A tooth is present on the front tibia of the males in *Tychius meliloti*, Steph., *T. tibialis*, Boh., and *T. pusillus*, Germ. In *Bibloporus bicolor*, Ol., and *Megarthus hemipterus*, Ill., there is a strong tooth on the middle tibia, whilst in *Megarthus denticollis*, Beck., there is a strong tooth at the apex, and in *Stenus binotatus*, Ljun., there is a small tooth on the hind tibia. In *Euplectus punctatus*, Muls., there is a spur at the apex of the middle tibia.

An angled condition is present on the front tibia of the male of *Dorytomus tremulae*, F. In *Strophosomus faber*, Hbst., the hind tibia is strongly excavate at the apex, whilst in *Stenus ater*, Mann., it is emarginate on the inner side just before the apex. A bent condition of the tibiae, usually the hind, is the characteristic of the males of many species. The front tibiae in *Strophosomus curvipes*, Thoms., and *Phytonomus punctatus*, F., are strongly bent. The hind tibiae are slightly sinuate in the males of *Megarthus depressus*, Pk., and strongly bent in *Hydrobius perrisi*, Fair., certain *Liodes* as *L. calcarata* and in many other cases. The strongly bent hind tibia species are frequently very convex in form. A slightly bent condition of the front tibiae is found in *Apion radiolus*, Marsh, and *Philonthus splendens*, F. A thickening of the hind tibia occurs in *Proteinus limbatus*, Maek.

The tarsi are of great importance as a means of the determination of sex. In *Philonthus*, apart from the *Gabrius* Section, *Quedius*, *Necrophorus*, etc., the masculine tarsi have each joint much enlarged as compared with the feminine. In many genera of the Geodephaga, as *Harpalus* and *Calathus*, and in *Phytophaga*, as in *Lochmaea*, a similar condition occurs, but in certain water beetles is met the most extreme condition in this respect. Valuable work in connection with the separation of species has been done in the genera *Haltica* and *Longitarsus* by investigation of the comparative differences between the sexes as regards

the joints of the tarsi. The shapes of the individual joints in the sexes are also of great assistance in the sexual determination. The number of joints in the sexes as in *Laemophlaeus*, *Pediacus*, etc., are often dissimilar. In fact, the joints of the tarsi are a very interesting subject for study.

The length of the front legs of the male in *Dorytomus longimanus*, Forst., and *Lucanus cervus*, L., is a striking feature and numerous other differences of the limbs exist which will afford ample means for the purpose we have in view.

In conclusion, I may say that the question arises as to the reason for the presence of the secondary sexual characters. What advantage do the males possessing the particular character have from the possession? What is the reason for the difference of colour in a part, the possession of a tooth on a limb, or any other particular differentiating character? Have they any effect on the proportionate number of the sexes and are they a contributing cause to the scarcity of the masculine examples in certain species as in *Otiorrhynchus singularis*, L.? Whatever the causes of, or reasons for, the differences, it is our part to record in literature any fresh differences observed. I consider it should be the aim of present and future coleopterists to determine by investigation of the habits of coleopterous species the reasons for the existence of the distinctive secondary sexual characters.

CHANGES IN THE INSECT POPULATION OF BRITAIN DURING THE LAST 100 YEARS.

By Dr K. G. BLAIR, F.R.E.S.—Read 25th February 1937.

In the course of a short paper it is obviously impossible to deal adequately with such a vast host as the insect population of Britain, and my remarks, therefore, will be almost limited to two orders, the Lepidoptera and the Coleoptera, the two orders in regard to which we possess the most ample data as to their distribution both past and present. The cases considered seem to fall into two main groups. The first comprises those species which are strictly local in their habits and which are readily exterminated in any particular locality by the disturbance of the ecological conditions pertaining to such locality; the second, those with a more general distribution throughout the country. In this latter group one might expect cases of extermination to be not only much rarer but also much more gradual in operation. Probably the two most spectacular instances of insects becoming extinct in Britain within the period under consideration are those of the "Large Copper" Butterfly and the "Black-veined White," cases which fall one in each of the two groups mentioned. The "Large Copper" was formerly plentiful in parts of the fen districts but entirely disappeared within the course of a few years about the middle of the last century, whereas the "Black-veined White," at one time of fairly general distribution over the southern part of the country, became gradually restricted to a few favoured localities, lingering on in parts of Kent until within the last few years.

It will be sufficiently obvious that we must disregard cases of sporadic or casual appearance, in the past or present, that fail to repeat themselves; we cannot for example lament the extinction of "Albin's Hampstead Eye," *Cynthia hampstediensis*, Steph. (an Australian insect), *Precis vellida*, F., ssp. *calybe*, Godt., or "the Scarce Swallow-tail," *Papilio podalirius*, L., or claim the Monarch Butterfly, *Danaus plexippus*, L., as more frequent in Britain than was formerly the case, but must confine our attention to species that though perhaps local are, or were, on a permanent footing as natives of the country.

To consider first certain specialised districts. Mention has already been made of the "Large Copper," formerly inhabiting the fen districts. From the same district and about the same time disappeared other well-known Lepidoptera, e.g., the Gipsy Moth, *Lymantria dispar*, L., the "Rosy Marsh Moth," *Noctua subrosea*, Steph., and somewhat later, about 1880, the "Reed Tussock," *Laelia coenosa*, Hb., while yet more recently, within the present century, the "Marsh Dagger," *Acronicta strigosa*, F., and the "Orache Moth," *Trachea atriplicis*, L., seem to have gone the same way. Not only the butterflies and moths but

many of the fen beetles have become very much scarcer than formerly and in some cases have not been taken at all for many years. Thus Omer Cooper and Tottenham, in dealing with the *Carabidae* in "The Natural History of Wicken Fen" (1928), enumerate 29 species in this family alone that they consider have definitely decreased since 1854, the date of Dawson's "*Geodephaga Britannica*," and 26 of these they consider to be now definitely extinct in the area and some of them probably in Britain. It is significant that many of these disappearances closely followed the improvement of the drainage system in the fens. Yet that the one was the direct consequence of the other is not fully established, since the foodplant in certain cases, such as the Great Water Dock, the foodplant of the Large Copper, still remains in adequate quantities, and other local species inhabiting the same area, as for example the Swallow-tail Butterfly, still survive in fair numbers. Indeed, in the case of the Large Copper this butterfly is said to have disappeared from Whittlesey Mere in 1845, the last specimens having been taken in Holme or Yaxley Fens in 1847 or 1848, three years before Whittlesey Mere was drained. Omer Cooper ("V.C.H. Hunts," 1926) suggests that its extinction may have been brought about by the collecting of larvae by local people, or by the burning of the Mere, its only breeding locality, a few years before it was drained. The disappearance has also been attributed variously to too persistent collecting and to the attacks of parasites or of some epidemic disease, but in default of definite data this is little more than guesswork. In the case of the beetles the cessation of the custom of regularly cutting the sedge is generally held to be mainly responsible for the falling off in the numbers of certain species. In former times cutting was done annually and the sedge used for thatching; this custom resulted in the periodical opening up of the ground to air and sunshine, at the same time providing suitable hibernacula for certain of the species; but with the replacement of thatch by galvanised iron, slate, etc., sedge-cutting ceased to pay for itself and has been gradually abandoned, with the result that the ground has been very largely overgrown with carr, i.e., a shrubby growth of buckthorn, willow, etc., smothering out the low-growing plants.

Another area, formerly the home of many local species of beetles, now completely destroyed from the faunistic point of view, is the marshy ground bordering the River Thames in the neighbourhood of Hammer-smith and Battersea, now overwhelmed beneath bricks and mortar. One need only glance through the pages of Fowler's "*Coleoptera of the British Isles*" to appreciate the loss that this means to the British fauna, particularly among the *Carabidae* and *Staphylinidae*. A similar fate has to some extent befallen the Isle of Sheppey, and Commander Walker in his recent "Annotated List of the *Coleoptera* of the Isle of Sheppey" (1932) notes many species that have now disappeared, some from their only known British habitat.

At numerous other places along the coast the development of coastal resorts, e.g., Bournemouth, Torquay, Paignton, and many others has

"improved" many local beetles off the face of the land. But not only is the encroachment of the towns responsible; from many a quiet secluded bay arises the same tale of woe. Mr J. H. Keys of Plymouth, a veteran coleopterist with a collecting experience fully covering the last 50 years, sends me a long list of beetles that have disappeared from the coves of S. Devon and East Cornwall. Much of this devastation he attributes to the same cause that exacts such heavy toll of the sea-birds' lives, waste oil from ships rendering the beaches no longer habitable. Further serious damage he attributes to the advent of motor cars. No matter how secluded it may be, no bay or cove is free from the motor parties, which, parking their cars as near as they can get, troop down to the sands, rush about and churn up the loose sand above normal tide marks, and so make life no longer tenable for denizens of this belt of the shore, a belt with a highly characteristic fauna of its own. One cove, formerly a locality for many good beetles, has been taken over by the Government for the Air Force and the public excluded, a fate which might have saved it from the motor pest, but on his last visit Mr Keys found many "evil-looking trickles of water, which meant extermination for the insect population." At Tregantle, the only known British locality for *Psammobius porcicollis*, Ill., the Government have made a rifle-range and exercise ground, and "the chine is dug up, dug up, and again dug up. So that place is gone." Motor-oil and drainage from the tar-mac roads, and very possibly dust blown from such roads, have also been noted as inimical to insect life in streams, ponds and ditches.

In many cases, however, the disappearance of an insect from its former haunts is not to be so readily accounted for. In Gilbert White's time the Field Cricket was common in the vicinity of Selborne, but seems to have now vanished from the chalk downs of the mainland, though still maintaining a somewhat precarious existence in the Isle of Wight. Its relative the Mole-cricket appears also to be very much rarer than was formerly the case, a result partly due perhaps in this case to improvements in drainage.

Instances of insects of more general distribution that have become scarce or disappeared within the same period are naturally not nearly so numerous as those of more localised habitat, since if exterminated in one spot by, for example, the encroachment of building, there are plenty of other colonies near or far to maintain the race. Besides the Black-veined White before mentioned we may recall the case of the Mazarine Blue, *Cyaniris semiargus*, Rott., formerly to be found in many localities in the southern half of England, but of which the last record appears to be from Kent in 1874. The Glanville Fritillary, *Melitaea cinxia*, L., now confined to the Isle of Wight, and at one time approaching extinction even there, was formerly much more widely distributed in the country; and doubtless many other cases will be recalled. The case of the sawfly, *Athalia rosae*, L., is interesting, as this species is mentioned by Curtis as a pest on various cruciferous crops, but sub-

sequently declined in numbers, finally becoming extinct in Britain about the beginning of the present century (Benson, 1935).

Though many of these insects have no doubt disappeared for good from our native fauna, there yet remains a hope that some of them at least will again be found, either as the result of fresh immigrants from the Continent establishing themselves or, perhaps more probably, having been with us all the time in hitherto undiscovered colonies. Among the larger Lepidoptera such cases are rare, but in the Coleoptera numerous cases have occurred within the last few years. Among these may be mentioned the weevil, *Procas armillatus*, F., rediscovered a few years ago in some numbers in one of its old localities near Brighton after an apparent absence of well over 50 years; *Acalyptus rufipennis*, Gyll., found again in the neighbourhood of Oxford by Commander Walker; *Dryocoetes autographus*, Ratz., found in numbers near Scarborough in 1869 and apparently not again until recently by Mr Hignett in profusion near Oswestry, and, lastly, the researches of Mr Donisthorpe in a classic locality, Windsor Forest, have demonstrated that many species still exist there though there had been no record of them, in some cases, for over a century.

The little dragonfly, *Ischnura pumilio*, Charp., formerly not uncommon in some of the swampy bogs of the New Forest seemed to disappear about 1907 and was thought to have gone, but has again been found within the last year or two.

The "Comma" Butterfly would until recently have ranked among our disappearing species. Formerly common and widely distributed, it became at one time almost confined to the Wye Valley, but in the last dozen years or so it has again extended its range until it is now not only to be found but is actually common over most of the southern part of the country. The gorgeous "White Admiral" and the "Silver-washed Fritillary," after a marked decline have also again extended their range as well as increased in numbers within the last few years, and I believe the same thing, though to a less marked extent, may be said of the "Purple Emperor," the "Wood White" and the "Large Tortoiseshell."

Turning now to the other side of the account, let us see what insects have either been added to the British list or have become distinctly more numerous than in former times. Every year sees a number of insects of various orders added to the British list, but many of these are merely recognised for the first time as distinct from some well known form with which they have hitherto been confused. Such cases, of course, do not now concern us. But there yet remain many undoubted accessions to the British fauna. A striking instance is that of the Golden *Chrysoptera* (*Plusia*) *moneta*, Fab. First recorded as British in 1890, when it was taken at Emsworth, Sussex, near Dover, Tunbridge Wells, Waltham Cross, and Reading, it spread rapidly over the country until it is now only too plentiful as a pest of Larkspurs and Monkshood.

Many species, particularly among the smaller moths and the beetles, have been introduced to our lists in the guise of warehouse or domestic pests. Conspicuous among the latter is *Ptinus tectus*, Boield., one of the "spider-beetles," first recorded as British in 1904 and now only too plentiful and widely distributed. *Hylotrupes bajulus*, L., formerly one of our rare Longicorns, is now becoming a pest in softwood timbers used in building construction. Other species of the same group, formerly practically confined to the Scottish pine woods, have now spread to the pine woods of the south, e.g., *Asemum striatum*, L., and *Crioccephalus rusticus*, L., while their near relatives, *C. polonicus*, Mots., and *Tetropium gabrieli*, Weise, have appeared and spread in the south, having probably been introduced with continental timber. The weevil, *Pissodes notatus*, F., and certain Scolytidae are also to be numbered among the northerners that have come south in search of a fortune. The case of *Cis bilamellatus*, Wood, is rather puzzling. First described in 1884, it was long considered a local rarity though occurring in numbers when found, but is now far from uncommon in the south-eastern counties. It is difficult to believe that it can have been for so long overlooked, and yet its source of origin is hitherto unexplained. The fine Buprestid, *Melanophila acuminata*, De G., first found by Mr Champion in 1909, and occurring in some numbers on freshly burnt pines near Woking and in the New Forest, can hardly have been overlooked if present much before that time.

There are also certain curious cases of exotic beetles having become established in a wild state. Among these may be noted the fern-feeding weevil, *Syagrius intrudens*, Waterh., described in 1903 by Mr Waterhouse on examples from Dublin, where they are still to be found both in greenhouses and in the open. A few years ago the same species turned up at Horsham, Sussex, yet although it belongs to a genus exclusively Australian in distribution it appears to be as yet unknown in Australia as an endemic species. The Australian *Saprosites mendax*, Blbn., well established at Arundel, will also be recalled. The Japanese Staphylinid beetle, *Philonthus rectangulus*, Shp., has within the last year or two been taken in several widely scattered localities in England as well as in Italy, France, Germany and North America; the pretty little *Anthicus tobias*, Mars., known from Turkey, Mesopotamia and India, was found a year or two ago by Mr Bedwell in an orchard in Kent, about the same time by Mr Britten near Manchester, and has now appeared in North London; it has also been recorded from Holland and Germany. Some of these cases are from rubbish dumps which harbour various other aliens such as the "House Cricket," the domestic Cockroach and the Earwig, *Anisolabis annulipes*, Lucas, insects that, except in such conditions, are not usually found out of doors in this country. The North American leaf-hopper, *Graphocephala coccinea*, Forst., recently reported from rhododendrons in Surrey, appears to have established itself and to be spreading, as has the N. American Tingid, *Stephanitis rhododendri*, Horv., on the same plant.

Reference has already been made to the disappearance of many beetles from the fen districts, but here again there is something to be said on the other side also. In the paper quoted, Omer Cooper and Tottenham list 20 species of Carabidae as definitely commoner than in the middle of the last century, and of these 10 are not mentioned by the old collectors and are presumed to have since colonised the area.

Many insects, though much more frequently taken now than was formerly the case, owe their apparent increase not to any definite increase in population but to the fact that the details of their economy are now better known. Among the Lepidoptera the clearwing, *Synanthredon* (*Sesia*) *andraeniformis*, Lasp., may be cited, as well as the recently discovered *S. flaviventris*, Stgr., and among the beetles many of the regular inhabitants of the nests of moles and other small mammals; formerly many of these were among the rarest of the rare, but are now readily to be found in their special habitats. The discovery by Mr Donisthorpe of the ant, *Lasius brunneus*, Latr., in Windsor Forest was followed by that of a number of species of beetles living in its nests or runs that until then were either unknown in this country or had only been very rarely taken.

Another curious case of an insect spreading rapidly over the country is that of the makers of the bullet-gall of the oak, *Cynips kollari*, Htg. This gall was first discovered in Britain in Devonshire in 1834, and 20 years later had spread to Somersetshire and Gloucestershire. In 1858 Mr F. Smith of the British Museum procured a lot of the galls from Devonshire and distributed them in different localities around London for the purpose of observation, thus materially assisting in their spread throughout England, until it has become one of our commonest and most widely spread galls. Though so common the life-cycle of the causative insect yet remains very incompletely known. It has been asserted that the gall of the alternate generation is that known as *Andricus circulans*, Mayr., a bud-gall that in this country appears to be confined to the Turkey oak, *Quercus cerris*, L. Mention may also be made of another gall, due, however, not to an insect but to a mite, *Eriophyes tri-radiatus*, Nal., that causes the moss-like growths on the twigs of willow trees. This seems to have appeared in North London about the beginning of the present century and has since spread considerably. Both these galls form very conspicuous growths that could not have been previously overlooked, yet their country of origin and mode of entry remain a mystery.

Among the sawflies Benson (1) mentions *Phymatocera aterrima*, Klug, on the Solomon's Seal, *Polygonatum* sp., as a possible alien. Whether this be so or not it certainly appears to have become very much commoner and more widely distributed within recent years.

A note on a curious case of one insect supplanting another is sent me by Mr J. H. Keys. The weevil, *Barypithes pyrenaicus*, Seidl., was first noticed by him in Cornwall in 1880, and is now found not rarely in faggots, by sweeping, and in grass traps, yet is not represented in

the older collections of the county such as those of J. J. Reading and the Rev. T. A. Marshall. Oddly enough, it appears to have replaced *B. brunnipes*, Ol., which was formerly not uncommon in the district but has not been seen for many years.

Thus we see that though the losses to our insect fauna have been considerable and due to a variety of causes, partly to the improvements in drainage, partly to the encroachments of building, and in the case of maritime species to floating oil brought in by the sea, to the over-running of their restricted haunts by motor-borne trippers, and occasionally, as in the case of the beetles, *Chlaenius schranki*, Duft., *Drypta dentata*, Ross., and perhaps others, to the destruction of their haunts by coast erosion or by land-slides, and probably also to other causes as yet not ascertained, yet we have to set off against these losses a shorter but by no means inconsiderable list of gains; but the irony of it is that these so-called gains are to no small extent pests that everyone but the collector would very much sooner be without.

In some cases of variable rarity among insects we may be able to trace a more or less regular tide of ebb and flow, possibly connected with the long period weather cycles of which we hear a good deal these days; or possibly several favourable seasons of prosperity and increase may be followed by an unfavourable season or two; or their very prosperity may bring about a corresponding increase in the biological controlling factors, such as parasites or disease, so reducing the species to a very low level, during which it may pass for some seasons unnoticed or may even be brought to a temporary or permanent extinction in this country (1).

Before we can hope to reach any definite conclusions on these points it will be obvious that we must have a very much more extensive series of records, records covering not only long periods of time in definite localities, but also widely distributed over the country, and records particularly not only of the occasional appearance of rarities, but of the varying numbers from year to year of many of our commoner species. For this purpose collaboration between a large number of observers is essential. Much labour is no doubt already expended in the conscientious compilation of such records by observers all over the country, but little of it ever sees publication, and on the death of the observer his records are lost and his labour wasted. It seems to me that much of this loss might be avoided if these records were handed over or bequeathed to the various Natural History Societies so as to be available for reference by students of a future generation.

PAPERS TO BE CONSULTED.

1. Benson, R. B., 1935. "The Alien element in the British Sawfly Fauna." *Ann. Appl. Biol.*, 22: 754-768.
2. Donisthorpe, H. 1920. "Distribution of British Beetles. Some Notes on recent extensions of Range." *The Vasculum*, 6: 32-37; 65-72.

A FEW NOTES ON *PACHYTHELIA VILLOSELLA*, OCHS.

By H. G. HUGGINS, F.R.E.S.—Read 11th March 1937.

During the past few years, at odd times, I have tried to find out a little about this large and curious Psychid, whose cases I have frequently found in Hampshire and Dorset.

The full-sized case, when fixed for emergence, is familiar to most collectors who have been in the insect's restricted habitat, which is, roughly, the southern portions of Hampshire and Dorset. Nearly every such collector must occasionally, in the course of collecting on the heaths, have noticed the big caddis-like case; it is strongly attached by a tough piece of silk, and to detach it safely requires careful scraping with a sharp pen-knife. The case is composed outwardly of twigs, usually portions of heather stems, though occasionally strong grass stems or pieces of bracken enter into its composition. It varies from $1\frac{1}{2}$ to nearly 2 inches long and is of about the thickness of a lead pencil; the twigs are arranged longitudinally and regularly and are very strongly attached to the thick inner case of tough silk.

The case appears usually to be fixed for emergence in April, the exact date, of course, depending to a certain extent on the progress of the season. It occurs most frequently from between one to two feet from the ground, though this is subject to exceptions; I once found it as high as three feet six inches from the ground, and several times only a few inches from the surface of the soil.

I have more than once been informed that the male cases are fixed on a lower level than the female, and are thus more difficult to find. This does not coincide with my experience, and appears to me only a casual theory to account for the disparity in numbers between the sexes bred. I opened with great care several low cases, all of which proved to be female, whilst a case I opened, found over two feet from the ground last June, proved to be male.

The full-grown larva appears to travel some distance at times in search of a suitable place to hang up, and, in spite of its heavy burden and the fact that it crawls with the six true legs only, it is quite a fast mover; in fact, it is surprising how lively its movements can be. I have several times found it in burnt-out places, where the larva could not have survived; in 1933 I found several on charred fir stumps in Dorset where the whole ground had been completely burnt out for 80 yards around in the previous autumn and the young grass was only beginning to spring in one or two places at the time of my visit. I think from this that the full-fed larvae must have crawled in the spring about 80 yards from the nearest unburnt heather to the trees.

The larva will fix its case to anything wooden so far as I can see; I have found it on trunks of fir, beech, and hawthorn, and also on

wooden palings, gate-posts, heather and gorse bushes, occasionally at the end of the twigs of these latter. It appears to dislike other substances, however, as I have only once found it on brick-work and never on stone, though concrete posts are not uncommon as wire supports on some of the heaths.

The caterpillar appears to live for two years, but does most of its growing, so far as I can see, between April and June in its second year. The egg is, of course, laid in the case by the apterous female, and the newly-hatched larvae are curious looking little creatures, as when they first emerge from the case they are covered with fine gossamer threads. Almost immediately, however, they construct minute caddis-like cases with small pieces of fine heather-twigs or grass-stems. I fancy they spin these cases themselves from the fineness of the texture, but have sometimes wondered if part of the lining of the parental case is consumed, as, if it is opened after their departure, it will be found entirely filled with a mass of spun up silky substance in which the old case seems to be mingled. I also believe that the dried-up remains of the parent are consumed by the young larvae, as no trace of her appears in the case, although I think she sometimes falls out. It must be remembered that, in captivity, several of the *Psychids* are practically omnivorous, and will eat dry dead insects as well as vegetable rubbish and fresh food.

I have never found these small larvae wild, but in captivity they usually appear to hibernate, or partially hibernate, at about the size of a large *Fumea casta* case. I think, however, that hibernation is incomplete, as on a warm day they usually can be seen pottering about and nibbling, and have increased in size by the spring (when they survive). The greater part of mine die in the winter, however, probably from insufficiency of suitable food. In spring till about June their growth is very rapid, by mid-June they are nearly full-sized and after this they feed in a very fitful way till the autumn.

They have also, in the wild, what is, from a collector's point of view, a rather annoying habit of attaching themselves to a heather stem for a few days and then cutting loose and feeding again. The large female case, if found in early June when thus fixed, gives hopes that it is a pupated example of the slightly smaller male case, and after a period of anxious watching for the emergence of that lively insect the caterpillar dashes the collector's hopes by cutting loose and feeding again.

The larva is quite an orthodox looking creature when removed from its case, being mottled greenish-grey and hairy with a general facies which reminds me somewhat of a *Lithosiid*. It appears to be fairly agile, as when it attaches the case to a post it turns right round inside it before pupation so as to be able to make an unobstructed opening for emergence.

Pupation usually takes place about the end of April. The male is a reddish-yellow tough-shelled pupa, which pushes its way out of the case

so that one-third to one-half is free at emergence; the female pupa is much more fragile, and if the case be opened just after emergence, which takes place inside, the pupal skin will be found crushed down like a flattened concertina at the bottom. I think the female insect cracks the pupal shell with the chitinous plate on her head, and wriggles up the case crushing the shell behind her.

There seems to be some divergence of opinion about the time at which the male emerges. Usually, of course, it does not emerge, as 19 cases in every 20 appear to be female, but in my slight experience the male emerges about 6.30 a.m. summer-time and remains perfectly quiet till about 8 o'clock p.m. Then he begins to move about, and must, of course, be killed at once if required as a cabinet specimen, as he begins to smash himself to bits almost at once, and the thinly-scaled blackish wings show the slightest scratch. I have also been informed that he emerges late at night, I do not know on what grounds, and Mr J. C. F. Fryer has had him emerge at 11 a.m.

The male can sometimes be seen flying furiously in the sunlight. I rather think this is when he has been disturbed, but of course he may be a normal sunlight flyer like certain *Bombyces* whose females fly at night. My reason for suggesting this comparison is that the female usually calls in the late evening, hence I think that copulation takes place then, although I have not witnessed it. I do not know at what hour she emerges, but I have seen her calling as early as 8 p.m. (summer-time) and as late as 11, but the main call appears to take place from 9 to 10.

The female when calling extrudes the anterior portion, one-third, of her fat white naked body from the case and remains so for perhaps an hour. She appears, as far as I can judge, to call for three or four nights in succession if not fertilised. She is, of course, absolutely devoid of all external organs except the ovipositor; no trace of wings, legs, or antennae are to be seen. She is just a fat white cylinder with a brown chitinous plate (on the function of which I have already hazarded an opinion) on the upper surface where the head should be, and a well-developed ovipositor. She is, however, much more muscular than one would suppose from her helpless appearance; two that fell out of their cases managed to progress some distance round a flat tin box in which I placed them.

The abdomen of the male is capable of enormous extension, and of course becomes much attenuated when extended, and I have no doubt that to effect copulation, which must take place within the case, the male abdomen is extended right past the length of the female body remaining in the case at calling time (roughly two-thirds) to effect the pairing. It is obviously impossible for the female to project any further from the case without running a grave risk of toppling out and being lost, as the case always hangs with a slight downward tendency, and it is equally impossible for the large-thoraxed male to get inside at all. The late Rev. C. R. N. Burrows had a theory that the male irrigated the

whole interior of the case and thus fertilised the female, but a careful examination of the extensibility of the body of the newly-killed male, combined with a knowledge of the method of fertilisation of some of the North American Psychids, lead me to a different and less unusual conclusion.

There is one further point of interest about this remarkable insect. In my experience about one case in twenty produces a male in this country, but the late Rev. C. R. N. Burrows informed me that cases found by Dr Chapman in Southern Europe produced about one male in four. *P. villosella* is obviously at the extreme limit of its northern range with us, being confined to two southern counties, and Mr Burrows suggested to me that he thought that the lack of heat in this country might cause the lack of male development, and that the species might be on the road to an unisexual species, as parthenogenetic races are known in other species of the group.

I have, however, as yet been able to trace no proved case of parthenogenesis in *villosella*. Some years back a number of larvae emerged from female cases collected early in the season, before emergence time, and I put this down to parthenogenesis. Last year, however, I carefully segregated a number of unemerged female cases, and although the females emerged and called in due time, in no case did larvae result. I am, therefore, convinced that in my former case, where a large number of pupae were together, a male emerged and fertilised some females and escaped and that the emerged pupa was overlooked.

A HOLIDAY IN THE HAUTE SAVOIE.

By A. BLISS—Read 8th April 1937.

When I was a small boy I suppose that the two insects which I looked upon almost with veneration were the "Camberwell Beauty" and the "Clifden Nonpareil." But in spite of the fact that, in recent years, large numbers of the former have been released by Messrs Jones and others, I have never seen a specimen flying in England. As for the latter, *Catocala fraxini*, L., I have been equally unsuccessful; nevertheless I am hoping to obtain from one of our members, who exhibited this species at our last Annual Meeting, the recipe for the sugaring mixture which he uses, since I presume that it is more potent than my own.

There were other butterflies whose names used to thrill me as, no doubt, they have done many other small boys. Some of these have come my way, others have not, and probably never will.

If, however, one takes a trip to the Continent, within 24 hours of leaving London country can be reached where, in a comparatively small area, butterflies which either appear only in extremely limited localities or are now completely extinct in the British Isles, may be seen quite commonly.

In the spring of 1930 I started with my wife for a fortnight in the Haute Savoie. We left London in the last week of May on what was not primarily intended to be an entomological holiday. Nevertheless I took a net with me and returned with the few specimens which you have seen this evening. In addition I made a few observations of the flora and fauna of the district visited. We travelled via Newhaven-Dieppe to our destination, La Roche sur Furon.

The train journey lies, for the most part, through flattish country which gradually becomes more mountainous as one approaches the Swiss border. After passing Aix, which is beautifully situated beside a large and picturesque lake surrounded by mountains, we proceeded through thickly wooded gorges via Annecy to La Roche.

La Roche itself is on a plateau 2000 feet high and about 12 miles from Geneva. Within a few miles we had a fine view of the Savoy Alps rising to over 5000 feet and in the distance the snow-covered peaks of the Mont Blanc range were dimly visible.

The country near at hand is beautifully wooded and lilies of the valley were growing in profusion, whilst in the meadows were wild columbines and brightly coloured vetches. In the more marshy localities masses of the beautiful yellow trollius made a wonderful sight. I also noticed several of the wild orchis which grow in this country, including the frog, fly and butterfly. The beautiful little *Gentiana verna* grows on the higher slopes, as does *G. acaulis*, though I did not actually see the latter.

As regards the lepidoptera, I must confess to a certain thrill on seeing *Nymphalis antiopa*, L., for the first time flying in its wild state. Those I saw were, of course, only hibernated ones, but, when on the wing, their somewhat worn condition was hardly noticeable. *Carterocephalus palaemon*, Pall. (*paniscus*, Fb.) was observed sparingly and a form of Satyrid akin to *Erebia aethiops*, Esp., was quite common. *Polyommatus* (*Cyaniris*) *semiargus*, Rott. (*acis*, Schiff.) was quite plentiful in the open country and had a habit of sitting on patches of moisture in the roads together with large numbers of the common *Hesperiidae*, also *P. icarus*, Rott., and *Cupido minimus*, Fuessl. Several species of fritillaries occurred in the woods, amongst others *Brenthis euphrosyne*, L., *B. selene*, Schiff., *B. dia*, L., *Melitaea cinxia*, L., *M. athalia*, Rott., and the beautiful *M. didyma*, Esp. *Aporia crataegi*, L., was very common in the meadows. A few *Papilio machaon*, L., were seen, both in the meadows, and sparingly at higher altitudes. The other Swallowtail, *P. podalirius*, L., was a lovely sight sailing gracefully along the banks in the lanes and also in the woodland glades, and was much commoner than *P. machaon*.

I noticed *Colias hyale*, L., flying at about 5000 feet, where there were masses of very large white anemones growing. *Colias croceus*, Fourc., was seen, though not in any great numbers, and *Leptidea sinapis*, L., was in evidence in the shadier parts of the wooded country.

On the rocky parts of the gorges and mountains the pink *Saponaria* grew in large quantities together with a form of yellow *genista*, and, in places, wild *laburnum*.

There were signs in the meadows of a kind of lily, not yet in flower, but which would probably be so in a few weeks' time. Possibly this was the St Bruno lily.

By the banks of a river towards Geneva I took a specimen of an insect allied to the ant-lions; it had a peculiar buzzing flight and looked very beautiful with its gauzy wings shining in the sunlight.

Amongst other insects I noticed *Polygonia c-album*, L., also the continental form of *Pararge aegeria*, L., a very bright Lycaenid akin to *Polyommatus bellargus*, Rott., a specimen of which I have shown to-night, but have not named, and the Copper, *Heodes doris*, Hufn.

In the woods, nests of larvae of a gregarious species of moth were abundant on pines.

The town of La Roche is most picturesque and is situated on the river Furon. On market days, which are held once a week, one can spend a most instructive day visiting the various stalls and vendors. Many small farmers come in from outlying districts with small cheeses, the making of which is a big local industry.

From a walking point of view, if I were visiting this district again, I should probably choose St Pierre Laurent, which is a few miles nearer Annecy and situated right at the foot of the mountains.

The weather, apart from local thunderstorms which occur suddenly and rather frequently, is pleasantly warm at this time of year (May,

June). I suppose the chance of rain is rather more than elsewhere, as is usual in mountainous districts, but, nevertheless, we enjoyed a large proportion of sunny days and owing to the clear atmosphere the sun can be extremely hot at times.

Should anyone wish for a holiday amongst delightful surroundings, I can confidently recommend this district. Hotels are cheap or rather were, for the exchange was then about 120 to the £1. The natives are most hospitable and charming people and I found their local wine, if a little sour, quite palatable mixed with "lemonade."

REMARKS UPON BRITISH CLAVICORNIA.

By F. J. COULSON—Read 22nd April 1937.

I must commence my remarks by stating that my sole object is to draw attention to points that aid the incipient coleopterist in the field in the systematic observation and the collection of the individuals of this group of beetles.

The group of families of Coleoptera known as Clavicornia is the second largest on the British List and comprises approximately 746 species, which is about 20.5% of the Coleopterous species occurring in the British Isles. The group can best be regarded as a heterogeneous assemblage of families which cannot scientifically be included in any of the other big groups. The name given to it is based on one character of the perfect insect and suggests that all the species are characterised by clubbed antennae and that all species possessing this character should be included. In neither case is this strictly a fact. The antennal club in the majority of the species is characterised by a variable number of the terminal joints being abruptly enlarged, but, in several families there is only a gradual thickening of the antennae towards the apex, a feature which occurs in many species of the section Heteromera. The usual number of joints affected is three, but two-jointed clubs in certain genera and in others four- or five-jointed clubs also occur. These general terms would include four families, e.g., *Cisidae*, *Lyctidae*, etc., now included in the Terebrantia. A recent author has even placed the *Clavigeridae* and the *Pselaphidae* in the Brachelytra, which group they superficially resemble in the uncovered terminal segments of the abdomen. It will be seen, therefore, that scientifically the classification of this section is not ideal, and, until all the facts relating to the earlier stages have been ascertained and considered in conjunction with the knowledge accumulated as regards the perfect insect, the exact relationship of the twenty-four families of this section to families of the other sections will not be definitely determined.

Apart from the club, the structure of the different species, particularly as regards the legs and the basal joints of the antennae, is very diverse. The general shape of the species is usually oval or oblong with a variable degree of convexity. The habits and the habitat are very varied and the collection of the individual species, in Clavicornia, requires close attention to the exact circumstances of their occurrence. A considerable number are very local or rare, but on the other hand many are extremely abundant. Many are of economic importance as they are associated with commercial products. In this connection various cosmopolitan species of Coleoptera have figured on the British List as of doubtful occurrence until investigation based on the knowledge of allied species has settled that the species have become accli-

matized and occur under conditions other than those in which they were introduced. Broadly speaking, the Clavicornia are associated with the decaying of vegetable and animal matter, but living plants and living matter are the pabulum of many. The individual species of these "decaying matter" beetles are usually found in profusion, but many, owing possibly to a lack of knowledge of certain particular circumstances of their life-history, are only taken very occasionally. When the earlier stages of Coleopterous species receive greater attention, probably many species now regarded as scarce in Britain may prove to be obtainable in numbers locally. The capture of an isolated example in the field of any species previously unknown to the collector should therefore always be the starting point and not the finishing point in the investigation of its habits and habitat, particularly as many species are found associated with their larvae. All points that may aid in the investigation of the life-history of individual species should be noted at the time, as owing to their rarity, only with the combination of favourable circumstances will certain species again be met with.

The larvae of certain true fungicolous species can often be observed together with the perfect insect, and the rearing of these species is a matter of little difficulty if the infested fungus is taken home in bags. The species of *Polyporus*, for instance, are prolific in larvae and easily handled. Glass jars or tubes are useful for rearing the fungicolous *Enicmus*. The black fungus on ash branches is productive of *Diphyllus lunatus*, F., *Litargus connexus*, Geof., and *Mycetophagus atomarius*, F., *Laemophloeus ater*, Ol., and *Cryptophagus ruficornis*, Ste., occur in this fungus in the perfect state and these may be expected in the larval state. The best method of securing *Cryptophagus lycoperdi*, Herbst, and *Pocadius ferrugineus*, F., is by rearing the larvae found in the infested puffballs. The larvae of *Endomychus coccineus*, L., which feeds on *Auricularia*, can usually be found in the colonies of the mature insect. The various species of *Liodes* and *Thalycra fervida*, Ol., are presumed to feed upon the underground truffles, but the early stages of these species do not appear to have been much investigated.

The fungicolous beetles have doubtless been bred in numbers by coleopterists, but the descriptions of larvae and details of the larval habits of individual species available in literature are very meagre. Coleopterists have mainly devoted their attention to the collecting of the perfect insects and to the determination of species and to this charge I personally plead guilty. It is desirable that when larvae are reared a description together with a sketch should be made in order that information may be accumulated to provide material for a comprehensive work on the earlier stages of Coleoptera species.

There are few instances of living plants being attacked by members of the Clavicornia. *Byturus tomentosus*, F., however, is a pest on raspberry plants, and some species of *Meligethes* are injurious to Cruciferous flowers.

Subcoccinella is regarded as feeding on living foliage and in the case of *Brachypterolus pulicarius*, L., the seed pods of *Linaria* are the pabulum of the larvae. Numerous species are, however, found in the perfect state on the foliage and under the bark of various trees.

In this group there are many instances in which the larvae are predatory on both the larvae and the mature insects of other Coleoptera. In many cases these are rare insects in collections owing presumably to the fact that extensive rearing of the hosts is not pursued, as the latter are often common. Thus larvae of *Aulonium* are predacious upon the larvae of *Eccoptyogaster*. The *Laemophloeus* are all regarded as predatory, e.g., *L. clematidis*, Er., probably feeds upon *Xylocleptes dispinus*, Dufts., larvae in *Clematis vitalba*. *Teretrius* is predacious on *Lyctus* species, none of which are common insects. Occasionally the perfect insect of the predator can be found in the galleries of their hosts. *Rhizophagus depressus*, F., in the perfect state at least, attack and destroy *Hylesinus* larvae, and *Saprinus virescens*, Payk., is reputed to feed upon the phytophagous larvae of *Phaedon cochleariae*, F., on watercress. The majority of the Coccinellidae are well known as destroyers of the various species of *Aphides* and a species of *Scymnus*, possibly *capitatus*, F., feeds upon *Phylloxera* on oak leaves. *Ablattaria laevigata*, F., in the perfect state feed upon snails and can be found on the sandhills of the coast on marram grass thus engaged, whilst *Xylodrepa 4-punctata*, L., subsists on lepidopterous larvae, particularly on the oak.

In the case of Clavicornia which feed upon dead carcasses, the stage of decomposition determines the attractiveness to the various species. The flat woodlouse-like larvae of *Silpha* and *Oeoeptoma thoracicum*, L., and the *Nitidula* larvae, which are characterised by the two anal spines, can usually be found in most carcasses of animals and birds in the countryside. *Necrophorus* and certain *Hister* larvae may be found in similar situations. The larvae of the *Dermestidae*, well known owing to the damage done to biscuit stores, contain species having a carnivorous habit. *Anthrenus* larvae, besides damaging the dried specimens in cabinets, also cause damage to various fabrics. *Ctesias serra*, F., a member of this family not often seen in the perfect state, is easily reared from the larva, which occurs beneath the bark of oak and birch. *Symbiotes latus*, Reitt., occurs also under these conditions. Adhering to the under-surface of stones in rapidly flowing streams the scale-like larvae of *Helmis* can be found, but these, together with larvae of *Heterocerus*, which form miniature mole-runs in muddy shores, require special opportunity both for observation of their habits and the rearing of the larvae to the perfect state. There are, however, numerous larvae which can be reared, described, and portrayed without special facilities, and it would be as well if further material in this connection could be gathered.

In the perfect state many species of Clavicorns are found under very interesting conditions, as, for instance, in association with small

mammals, birds, and insects. *Nemadus colonoides*, Kra., for example, occurs in squirrels' nests, and *Antherophagus* species and *Leptinus testaceus*, Müll., in proximity with the habitations of field mice. Nests, according to the species of the bird by which made, as owls, starlings, etc., are favoured by many good species, as *Abraeus globosus*, Hoff., *Neuraphes rubicundus*, Lc., etc. As regards insects, the association of certain Clavicornia with ants has been well investigated. Humble bees' nests are frequented by many species, as *Cryptophagus populi*, Payk., *Leptinus testaceus*, Müll., *Antherophagus* species, *Epuraea depressa*, Il., etc. It follows, therefore, that old birds' nests, small mammals' habitations, and nests of *Vespa* and *Bombus* should be explored when observed, or, in the case of underground hymenopterous nests, noted until a suitable time for investigation occurs.

Carcases of birds and animals lying about the countryside, or of seabirds along the shores, usually have numerous coleopterous visitors. The burying beetles *Necrophorus*, the *Histers* (which occur also in cow-dung) and *Sciodrepa fumatus*, Spence, are but a few which can be secured under these conditions. Putrid fungi should also be examined. One species of *Necrophorus* at least is not averse to a meal off decayed fungi. In this connection it is a good plan to collect a small heap of hard or soft fungi in a suitable spot for frequent examination.

Accumulations of decayed vegetation, heaps of twigs or bark, cut grass, dead leaves, especially from damp bottoms of hedges, and haystacks and vegetable refuse generally are usually prolific in species of Clavicornia, in addition to *Brachelytra*, and in each type of accumulation certain species predominate. *Scaphidium 4-maculatum*, Ol., under small heaps of bark in woods; *Euplectus sanguineus*, Den., in cut grass heaps; *Cephennium thoracicum*, Müll., in dead leaves; *Monotoma* species in haystack refuse, are but isolated instances. In vegetable refuse and dead leaves many species as *Atomaria pusilla*, Payk., *A. atricapilla*, Ste., etc., and *Typhaea stercorea*, L., may occur in abundance. In fact, on a hot day the steaming heaps of decaying vegetable substances are teeming with Coleoptera, and careful sifting and selection will add many desired species of Clavicornia besides an abundance of the commoner.

In this connection a sequestered corner of a garden, or a wild uncultivated spot, in the vicinity of your residence is useful for the accumulation of a few heaps of decaying vegetation, as weeds, cut grass, etc., in which the various species can breed, and frequent examination by sifting at all seasons and times of the day will yield a good harvest of commoner species, as *Catops fuscus*, Panz., and an occasional prize unsuspected as occurring in the locality. This method could be extended by accumulating bones for *Nitidula*, etc., orange peel for *Epuraea*, or beetroot and carrion if available. My method of examining cut grass for the minute species is to make lanes in the material after a small quantity has been sifted on a large plate. *Ptenidium*, *Euplectus*, *Ptilium* and *Trichopteryx* species after a while are seen walking in the

lanes. Grass roots or moss from the base of trees often yield many species and the disintegration of turfs from mossy banks over a sheet of paper should be pursued as often as possible. On sandhills moss growing about the roots of marram grass is the haunt of many species. Samples of finely sifted refuse for examination should be brought home in small linen bags from localities visited.

As many good species occur in granaries and flour mills, any refuse from the mill available in the vicinity should be carefully sifted. Such species as *Laemophloeus ferrugineus*, Steph., and *L. minutus*, Ol., are usually abundant, but several species of *Cryptophagus*, *Aglenus brunneus*, Gyll., *Mycaetaea hirta*, Mar., and others may be taken. Cellars are frequented by certain species.

A fair proportion of Clavicornia frequent the bark of trees, both standing and felled. The sap on stumps of recently felled trees is attractive to *Epuraea unicolor*, Ol., *Glischrochilus* species, and many others, and later, when fungoid growth appears, such species as *Mycetophagus 4-pustulatus*, L., and *Scaphisoma agaricinum*, L., can usually be seen. Injuries to the bark of standing trees, particularly owing to internal feeders such as the Goat Moth, often yield good results upon examination. An afternoon is sometimes well spent by overhauling a wood pile or beating faggot stacks in woods. When bark has been removed and the moderate sized species required selected, careful examination after a short interval may reveal the smaller *Bibloporus bicolor*, Den., *Euplectus piceus*, Mots., *Stenichnus exilis*, Er., or *Ptinella tenella*, Er., which are frequently overlooked, walking in the burrows made by the woodboring larvae of other species. The mould in hollow beeches and in decayed decumbent trees is well worthy of attention as well in this connection.

Although the flowering bushes are visited by many and the sweeping net is required for others, searching is the keynote as regards the Clavicornia.

This group of beetles contains by far the largest number of named aberrations and the greater proportion of these are included in the *Coccinellidae*. Many colour variations or the intensity of the ground colour, whether wholly or in part, have been named. Many species, particularly those found under bark, as *Cerylon*, have a lighter or reddish form, which I regard as immature. Some of these lighter coloured forms, as for instance, *Rhizophagus bipustulatus*, F., ab. *gyllenhali*, Thom., and *Reichenbachia impressa*, Panz., ab. *unicolor*, Coll., have been named. Variation in the *Coccinellidae* is due to the extension of one of the contrasting colours at the expense of the other. In the spotted forms the situation, apart from the number of the spots, is also a basis for the naming of forms. The naming of aberrations by authors dealing with this family has been carried to the extreme, with the result that the correct designation of a particular aberration is a matter of difficulty. Two distinct methods by the earlier and the more recent

coleopterists have been adopted as regards the spotted forms of *Coccinella 10-punctata*, L., and a duplication of nomenclature has resulted in many instances.

Species such as *Mycetophagus multipunctatus*, F., or *Omosita colon*, L., owing to the inconstancy of the pattern, have received little attention. In *Mycetophagus 4-pustulatus*, L., the lighter blotches on the darker ground colour are sometimes united by a bar of the former colour and the size and number of the spots vary as well, which is the basis of the other described forms.

In some cases the presence of a darkened suture or marginal border is the aberrational character. In other species the variation in size has led to the diminutive forms and the larger than normal being distinguished as named varieties.

In *Cateretes rufilabris*, Lat., there are two distinct colour forms and *Bryaxis sanguinea*, Rb., ab. *nigripennis*, Gerh., is an instance of the normal red of the elytra being replaced by black.

One point in connection with Coleoptera in which I am particularly interested is the morphism in the sexes apart from the genitalia, and the Clavicornia exhibit many examples of species showing a wide divergency in the structure of the sexes.

The bandy tibiae of the male *Liodes cinnamomea*, Panz., of *Bythinus validus*, Aub., and of *Choleva agilis*, Ill., the abnormal thick legs of *Bibloporus bicolor*, Den., and the curved legs of many *Epuraea* species are striking instances. As in male *Thectura cuspidata*, Er., a member of the *Brachelytra*, the female of *Biblopectus minutissimus*, Aub., bears a spine on the anal segment. The characters of the sexes in *Choleva* and *Colon* have received much attention by systematists. A notch in a segment as in *Brachygluta haematica*, Leach, the conformation of the basal joints of the antennae as in *Cateretes pedicularius*, L., etc., the general shape in *Ptenidium*, the thick posterior femora of *Necrodes littoralis*, L., the antennal differences of *Anthrenus* and the length and shape of the antennal joints, as in *Laemophloeus ferrugineus*, Steph., and *L. minutus*, Ol., are but a few of the differences upon which the separation of the sexes can be made, and it would enhance the value of a collection if in each species the proper division of the sexes were shown.

VARIATION IN *GONODONTIS BIDENTATA*, CLERCK.

By Dr E. A. COCKAYNE, F.R.E.S.—Read 27th May 1937.

Gonodontis bidentata is a moth which appeals but little to the ordinary collector, and it has received less attention than it deserves from those entomologists who classify and name the various aberrations and races.

The following notes are by no means complete, but I have attempted to give an account of the variation of pattern, of the transverse lines and speckling, of the ground colour, and of the shape of the wings. In the typical form the ground colour is grey-brown, the ante- and post-median lines are well developed, and the discoidal spot in both fore- and hindwing is encircled with black. Sexual dimorphism is slight; the colour of the female tends to be lighter than that of the corresponding form of the male, and the tooth-like projections on the forewings are longer.

PATTERN.—The median area varies independently of the rest of the wing. In one form it is red-brown, though the rest of the wing is of the usual grey-brown colour, and in some specimens of ab. *nigra*, Prout, it remains pale, contrasting strongly with the black terminal and basal parts of the forewing. In another form the median area is darker than the rest of the wing, forming a band, as in one figured by Doering ("Int. Ent. Zeitschr.," 1932, 25, fig. 4). I have not seen a British specimen with so dark a central band, but Barrett says that in some of the darker specimens from the North and Midlands the median area is darkened more than the other parts of the wing, and figures one from Yorkshire (Pl. 289, fig. 1 g). I have one from Aberdeen with the median area dark and another from Manchester with dark pigment spreading inwards from both transverse lines and running across along the nervures.

On the other hand specimens from Northumberland may have the median area paler than the rest of the wing, but the finest examples with the basal and terminal areas darkened occur in the race which is found over the greater part of Scotland. One of these from Moray is figured by Barrett (Pl. 289, fig. 1 d) and I have a similar specimen from the I. of Lewis. The formation of a dark median band and darkening of the basal and terminal areas with a light median band are both common forms of variation in Geometridae. The former, for example, occurs in *Boarmia repandata*, L., ab. *conversaria*, Hb., and the latter in a continental form of *Boarmia rhomboidaria*, Schiff., figured by Millière, in *Cleora lichenaria*, Hufn., ab. *chretieni*, Lhomme, and in *Ectropis consonaria*, Hb.

TRANSVERSE LINES AND SPECKLING.—In specimens from Scotland, particularly those from the Highlands and the Hebrides, the lines are often very thick and the terminal area appears dark owing to the presence of numerous dark striae and a dark subterminal stripe. The ground colour may be very light or of the usual colour. W. S. Brocklehurst bred a

large and interesting brood from a female taken at Rannoch in 1914. All the moths had a very light ground, varying from pale ochreous to bone colour; some of the males had the lines very dark and thick and the terminal area much darkened; many others of both sexes had the wings so covered with dark striae that the markings and ground colour were almost hidden, but here and there on any part of the fore or hindwings the striae were sparse or absent, exposing the pale ground and giving the insects a mosaic appearance.

In the I. of Lewis there is a form in which the lines are narrow but the terminal area is dark except for a pale stripe distal to the postmedian. One of these is figured by Bowater ("Journal of Genetics," 1914, 3, Pl. 27, fig. 29). I have one with very similar markings, but the ground colour is straw-coloured and the lines and terminal band are pale red-brown. Barrett figures a specimen from Yorkshire which resembles the Hebridean form; the ground is whitish and the markings brown (Pl. 289, fig. 1 e), so that this form evidently occurs as an aberration elsewhere.

Apart from the Scottish race there is some variation in the position and clearness of the transverse lines.

Ab. defasciata, Hannemann. ("Int. Ent. Zeitschr.," 1917, 11, 62). In this the postmedian line is represented only by white. Male, Grunau.

Ab. defasciata, Kiefer. ("Krancher's Jahrbuch," 1916, 25, 136). Is a synonym, though the specimen was also *ab. edentula*, Krulik.

Ab. trapezoides, Schille. ("Polski Pismo Ent.," 1924, 3, 18). The forewings are a darker grey-brown than the type, the ante- and postmedian lines are black, far apart, and from nervure 2 run parallel to reach the inner margin instead of converging.

Barrett mentions a specimen in which the lines meet in the middle of the wing, so that there is no median band, and end in a large costal blotch. In another the lines are black and almost meet near the inner margin as in *Crocallis elingvaria*, L., *ab. signatipennis*, New. and G.S.

Very rarely all the markings may be absent as in a unicolorous yellow-brown specimen in the Mitford collection.

GROUND COLOUR.—Variation in the ground colour is considerable. It may be greyish white with little speckling and with the lines indistinct, as in the one figured by Bowater ("Journal of Genetics," 1914, fig. 26) from the Isle of Wight. Similar specimens were obtained by pairing a brother and sister of this, but five other pairings of the kind only produced infertile eggs. The ground may be a clear straw colour like that of *Crocallis elingvaria*, as in three from Cheltenham in the Adkin collection. All these pale forms are uncommon.

Ab. ochrea, Derenne. ("Lambillionea," 1927, 27, 49). *Ochrea*, *notis typicis*. In the I. of Lewis specimens occur with the ground pale straw colour and almost without speckling, but with the lines narrow and distinct. Perhaps these may be assigned to *ab. ochrea*.

Ab. hafneri, Wagner. ("Z. Öst. ent. Ver.," 1918, 3, 45, figs.). This is much darker than the type with the black lines obscured, but with the

white lines very distinct, though broken and present only on the nervures. This form is not uncommon in Yorkshire and elsewhere in the North of England, and the few I have bred from larvae beaten near Methlick, East Aberdeenshire, all approach this form closely.

From the I. of Lewis I have a very dark brown male and female with all the markings obscured and without white lines, and, according to Barrett, Porritt had a similar one from Yorkshire.

Barrett says that sometimes the ground colour is ferruginous and figures a pale one from Surrey (Pl. 289, fig. 1 c), as does Bowater (Pl. 27, fig. 31). I have a similar one from Co. Cork, so that it appears to be widely distributed, though not common. The finest red one I have seen came from the I. of Lewis. It is a male, almost unicolorous, of a rich dark rufous tint.

Ab. *nigra*, Prout. ("Ent. Record," 1901, xiii, 336) = ab. *surtur*, Bang-Haas. ("Iris," 1907, xx, 84). All the wings are deep blackish brown, almost black, with the markings either just visible or completely obscured. The antennae, legs and abdomen are black, but the thorax is light coloured. The form is not uncommon in parts of Yorkshire and Lancashire, and Bowater ("Journal of Genetics," 1914, 3, figs. 34-37) has proved that it is either dominant or epistatic to the type. One bred by Bowater is much lighter than the others, but is probably pathological and due to deficiency of pigment. Bowater has also bred a beautiful form of *nigra* with most of the median area smooth bright, rufous, dark red-brown, or pale brown with red-brown nervures, and gives figures of two of them (Pl. 27, figs. 38, 39). He tells me that he has never bred a male, and it may prove to be a sex-linked recessive. This is worthy of a name and I propose to call it ab. **mediorufa**, ab. nov., and take as the type the specimen shown in fig. 38.

VARIATION IN OUTLINE.—There is one variation in the outline of the wings, ab. *edentula*, Krulik (ab. *edentata*, Rbl.), which lacks the smaller teeth on the distal margin of the forewings. I have not seen the form from this country, but I have a narrow winged specimen lacking all the teeth and with the postmedian of the forewing and the transverse lines of the hindwing almost touching the discoidal spot. It came from Yorkshire and is probably pathological.

DEFICIENCY OF SCALES.—A form occurs not uncommonly in Yorkshire, both in the typical form and in ab. *nigra*, and more rarely near Reading, in which the interneural spaces in the middle of the forewings and in the greater part of the hindwings are so thinly scaled that they are semitransparent. The fringes are normal and the condition is symmetrical. Several have appeared in the same brood, and it is probably determined genetically, like a similar form of *Ephestia kuehniella*, Z.

GYNANDROMORPHISM.—This is very rare in *bidentata*. Bowater bred one with the left antenna and part of the left side of the thorax and wings male and the rest female. The remainder of the brood of twenty were normal.

MIDGES ATTACKING OTHER INSECTS.

By Dr K. G. BLAIR, F.R.E.S.—Read 24th June 1937.

On April 29th last in South Devon (see "Ent. Mo. Mag.," 1937, p. 143) I noticed some small black flies sitting upon and moderately firmly attached to *Meloë* beetles (both *M. proscarabaeus*, L., and *M. violaceus*, Marsh). When one of these was brushed off a drop of yellow fluid exuded from the spot. The spot in question was situated on the thinner membrane to the side of one of the dorsal shields of the abdomen, but the flies were also observed on the thinner membrane between the segments of the beetle and at the joints of the underside and legs, though not upon the harder parts. There was no question but that they were sucking at an actual puncture and not merely drinking the fluid so readily liberated by these Oil-beetles. I then tethered some of the beetles in order to have them handy for observation, and returning to them some thirty to forty minutes later found abundant further midges, not only sitting upon them, but others coming to the attack and yet others sitting quietly upon neighbouring grass-blades, their bodies distended with the yellow fluid of the Oil-beetles.

Of course, all these midges were females; so search was then made on any flowers around for males of the same species. On the daisies and hawkweeds that alone this small patch of turf afforded, numerous small flies were found, but no male Chironomids; however, a clump of wood-sage a little further off had swarms of small black male Chironomids that I hoped might be the desired species.

The midges from the *Meloë* were later identified by Dr F. W. Edwards as *Atrichopogon meloësugans*, Kieffer (1922), a species originally described from Algeria, where they were attacking another species of *Meloë*, and not previously recorded from this country. A closely related species, *A. rostratus*, Winn., has been noted attacking *M. proscarabaeus* in Denmark (Hansen, 1921). Unfortunately the males from the wood-spurge proved to belong to quite another group.

This adds one more to the records of insects of various orders being attacked by midges, all belonging to the Ceratopogoninae. Thus *Pterobosca paludis*, Macfie ("Proc. R. Ent. Soc. Lond.," B. 1936, p. 63) is found in Wicken Fen attached to the wings of various species of Dragonflies (one was exhibited here by me last year). This was the first record of the genus being found in Europe, though other species, also attacking Dragonflies, were known from New Guinea and from Assam. *Forcipomyia eques*, Joh., is similarly found on the wings of *Chrysopa* spp., first recorded in Britain in 1932 (Edwards, "Ent. Mo. Mag.," p. 114), though previously the same habit had been noted for this species in N. America and Finland. Another species of this genus, *F. papilionivora*, Edw., is recorded as sucking the wings of *Pieris brassicae*, L., in Wales,

while what may have been the same species is noted by Kryger (1914) on *Cidaria didymata*, L., in Denmark. *F. pallida*, Winn., is recorded by Edwards and Bainbrigge Fletcher ("Entom.," 1936, p. 192) attacking larvae of *Opisthograptis luteolata*, L., at night.

How long the midge remains attached to its victim no doubt varies with the host. Thus in the case of *Meloë*, with an abundant supply of fluid, the midges left in a distended condition after little more than half an hour, or perhaps less (unfortunately no precise details were noted), whereas with the relatively poor supply to be obtained from the wingveins of an Agrionid they remained attached, if I remember rightly, at least over night.

Though such records are as yet too few for certainty they at least afford indications that each genus or species of midge that acquires this habit limits its victims to a particular order of insects. It will be noted that most of these discoveries have been made of quite recent years, and it is hoped that all entomologists will be on the alert for further instances of the sort, and make a point of securing at least the parasite, and preferably the host also, and submitting both for identification and record.

A WEEK IN SEPTEMBER AT AVIEMORE.

By G. V. BULL, B.A., M.B.—Read 23rd September 1937.

I spent the second week of September collecting at Aviemore with Messrs Mellows and Pooles. We made an encouraging start the first two nights, taking 31 species of Lepidoptera at sugar on 7th September. After this the weather became progressively worse, with a strong N.E. or N.W. wind blowing. Conditions improved on the 11th, and we took 27 species altogether, 22 at sugar and 5 at light. Lamps were given up as almost useless after 16th September.

The commonest species at sugar were *Chloantha* (*Calocampa*) *solidaginis*, Hb., past its best, *Hydroecia nictitans*, Bork., *Amathes litura*, L., and *A. helvola*, L., this latter being smaller than the southern form and occasionally heavily bordered with black in the forewings. Towards the end of the week *Calocampa vetusta*, Hb., became common, but no *C. exoleta*, L., were taken. The party took about a dozen *Epunda nigra*, Haw., but only three *E. lutulenta*, Bork., were secured. *Amathes macilenta*, Haw., and the pale ab. *flavescens*, Esp., of *Xanthia fulvago*, L., were taken; the latter was much worn and the females could not be induced to oviposit. *Cidaria citrata*, L., (*immanata*, Haw.) was plentiful on the wing, at rest, and on sugar in great variety. The best capture of the week was a *Rhyacia* (*Noctua*) *depuncta*, L., unfortunately rather worn. On one night *Dryobotodes* (*Hadena*) *protea*, Bork., was plentiful in a nearby wood, but on the next two nights was scarce and absent.

Of larvae the most abundant were those of *Drepana lacertinaria*, L., *Pheosia dictaeoides*, Esp., and *Notodonta dromedarius*, L., this last being very heavily parasitised. A few *Colocasia* (*Demas*) *coryli*, L., *Lophopteryx camelina*, L., and *Pheosia tremula*, Clrck., were also taken as well as small *Aplecta tineta*, Brahm., and Noctuids including *Mamestra contigua*, Vill. Geometers were numerous on birch, pine and larch, including *Selenia tetralunaria*, Hufn., *Biston betularia*, L., *Gonodontis bidentata*, Clrck., and some *Eupithecia* on pine and larch.

The following completes the list of species taken: *Polyplocia duplaris*, L., *Agrotis nigricans*, L., *Noctua glareosa*, Esp., *N. castanea*, Esp., *N. c-nigrum*, L., *N. dahlui*, Hb., *N. xanthographa*, Schiff., *Triphaena comes*, Hb., *T. pronuba*, L., *Xylophasia monoglypha*, Hufn., (*polyodon*, L.), *Apamea secalis*, Bjerk., *Polia chi*, L., *Agriopsis aprilina*, L., *Phlogophora meticulosa*, L., *Amphipyra tragopoginis*, L., *Cosmia paleacea*, Esp., *Dyschorista iners*, Tr. (*Orthosia suspecta*, Hb.), *Cerastis* (*Orrhodia*) *vacinii*, L., *Scopelosoma satellitia*, L., *Chesias legatella*, Schiff. (*spartiata*, Hbst.), *Cidaria testata*, L., *C. populata*, L., *C. siterata*, Hufn., *C. miata*, L., *Thera cognata*, Thnbg., *Operophtera autumnata*, Bork., *Entephria* (*Lygris*) *caesiata*, Schiff., *Eupithecia sobrinata*, Hb. No butterflies were seen.

METZNERIA LITTORELLA, DOUGLAS.

By S. WAKELY—Read 13th January 1938.

This very local species shares with *Melitaea cinxia*, L., the distinction of being found, as far as Great Britain is concerned, only in the Isle of Wight. It is, however, even more local than the "Glanville Fritillary," and as far as is known at present is confined to a mile or two of coast-line near Ventnor.

The earliest record of *Metzneria littorella* in this country was the taking of several specimens by S. Stevens in April, 1848.¹ Although sought for by several entomologists at various times, it was not until fifty years later that Lord Walsingham succeeded in re-discovering it in the old locality.² He reported it as occurring "plentifully from May 6th to 29th (and perhaps later)." It was apparently known at that time that *Plantago coronopus*, L. (Buck's-horn Plantain), was the food-plant of the larvae, as bunches of the seed-heads were collected in January by E. Bankes which produced moths from 17th June to 25th July.³

It will be noted that the moths were captured by S. Stevens in April and by Lord Walsingham in May, yet when bred they did not commence to emerge until the middle of June. No doubt the early dates of the moths taken wild is explained by the fact that the locality is noted for its mild climate and catches a maximum amount of sunshine, as well as being sheltered from northerly and westerly winds.

I have seen no recent records of the taking of *Metzneria littorella*, but I know of several friends who bred numbers of the moths last June and July from *Plantago coronopus* seed-heads. My series shown to-night were bred from a batch of stems sent to me by H. G. Jeffery, of Newport, Isle of Wight. These were collected near Ventnor, and were found beaten down among the other herbage by the wind and rain and often caked with chalky mud which had been splashed about by the winter gales. It certainly looked rather unpromising material, and I examined several dozen stems before finding a larva. This raised my hopes, however, but I need have had no apprehension as the moths eventually came out in such embarrassing numbers that I could not spare the time to set them all, even after passing on a lot of the stems to a friend. I was warned that there were some beetle larvae present, evidently preying on the lepidopterous larvae, and one of these which I subsequently bred was determined by Mr Jeffery as *Psilothrix cyaneus*, Ol., a showy green species not infrequently found on flowers in suitable situations in June, and having a predacious larva.

¹*E.M.M.*, xxxvii, p. 149.²*E.M.M.*, xxxvi, p. 127.³*E.M.M.*, xxxvii, p. 121.

The food-plant of *Metzneria littorella*—*Plantago coronopus*—is widely distributed and common in the Isle of Wight. It is not confined to the sea coast, however, and the root shown came from the Shirley Hills, near Croydon, where I have known the plant to grow for some years on a garden bank by the roadside. In my opinion this is the plant really meant when *Plantago maritima*, L., is given as the food-plant of larvae of *Melitaea cinxia*. I have seen the larvae of *M. cinxia* swarming on it at Ventnor. One of the old writers gave *Plantago maritima* as food-plant for *M. cinxia* larvae years ago, and this seems to have been copied by many subsequent writers. My contention is strengthened by the fact that *P. coronopus* is rarely mentioned in this direction, and although *Plantago maritima* is common enough in the Island, especially on the northern coast, I have never seen it growing on the slopes where *M. cinxia* is at home.

To return to my subject, my first specimens of the moth emerged on 13th June, and they continued to emerge for about six weeks. By the 14th of July I had about 80 specimens on my setting-boards, and decided to set no more, but I noticed several more moths emerged after this date. The larvae feed among the seeds in September and October, retiring into the central stem for pupation, which does not take place until March or April.

Early records give Cheshire (Birkenhead) and Ireland as localities for *Metzneria littorella*, but subsequent investigation did not support the Cheshire claim, and nothing is known of any Irish examples.

In 1854, specimens were taken on the Continent and named *quinquepunctella*, Herrich-Schäffer, but the name *littorella*, Douglas, antedates this by four years. Stainton called attention to the fact that these species were identical in 1869.⁴

On the Continent the species is recorded from Corsica, Sicily, Italy, Austria, etc.

I should not be surprised if this moth were found to occur at other places in the Island, especially along the less-frequented coastline from Niton to Freshwater.

There are four other species in this genus occurring in Great Britain, viz.: *Metzneria carlinella*, Stain., on *Carlina vulgaris*, L.; *M. lappella*, L., on *Arctium lappa*, L.; *M. metzneriella*, Stain., on *Centaurea nigra*, L., and *Serratula tinctoria*, L.; and *M. neuroptella*, Zell., on *Carduus acaulis*, L., and *Centaurea nigra*.

In conclusion, I should like to express my thanks to Mr T. Bainbrigge Fletcher for the list of references to this species with which he furnished me; and also to Mr Jeffery for the generous supply of *Plantago* stems which enabled me to have the pleasure of rearing such an interesting and local insect.

⁴*Tineina of Southern Europe*, pp. 243, 244.

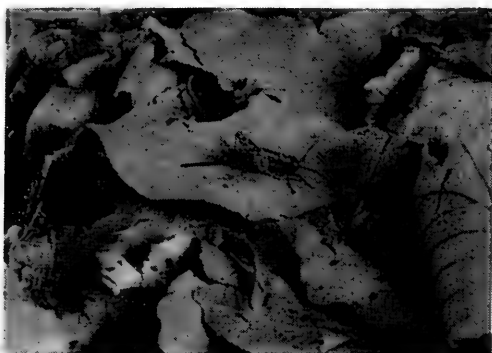


Photo. 1, 2, 3, E. E. Syme; 4, A. W. Dennis.

1. THE WOOD CRICKET, *NEMOBIUS SYLVESTRIS*, FAB.

Cage.

2. Male, 8.5 mm. 3. Female, 10 mm.

4. Ovum, 1.6 mm.

NOTES ON NEMOBIUS SYLVESTRIS, FABR.

By E. E. SYMS, F.R.E.S.—Read 13th January 1938.

In a book recently published on the "British Grasshoppers and their Allies," by Dr Malcolm Burr, the author mentions in the preface that, "Relatively little is known of their life histories." My remarks to-night are offered as a contribution to our knowledge of the life-history of the Wood-cricket, *Nemobius sylvestris*, Fabr., of which, so far as I am aware, a complete account has never been published.

In this country *Nemobius sylvestris* is a very local insect, but where it does occur it is abundant. Hampshire seems to be the only county in which it is found. In the New Forest it occurs in all suitable places and in the Isle of Wight in all the large woods. In August 1935 I found it very common at Borthwood, just outside Sandown, in Parkhurst Forest, and also in Hampstead Wood. Its natural habitat is among the dead leaves at the base of the bushes that grow along the ridings in the woods. It requires looking for, even in those places where it is common, and will not be found unless carefully sought. The best way to find it is to look for a suitable place, sit down and gently disturb the leaves. Then these crickets will come to the surface, rest a few moments upon a leaf and then crawl or hop away. Catching them with the hand often injures them, but if a glass tube is placed over them whilst they are on a leaf they can be secured without damage.

To keep these insects in captivity I have found a glass tank 8 in. \times 6 in. \times 6 in., with an inch of sand placed at the bottom covered by two inches of dead leaves to be very useful. Under these conditions the crickets will live in a healthy condition for long periods. In such a cage I placed three pairs taken in the New Forest on July 27th, and the males were seen alive up to November 6th, after which the cage was taken indoors, and the last female was seen alive on December 29th, but was found dead on January 4th. Feeding the crickets is a simple matter, for I found they took readily to sliced raw potato, both nymphs and adults feeding upon it. If placed in a cage without the leaves they live only a few weeks. What they feed upon in a state of nature I do not know, but in captivity they take a varied diet, including raw meat, dead insects, and all kinds of vegetable matter.

The female of *N. sylvestris* is a small dark brown insect with a body 10.0 mm. long and an exerted ovipositor of 7.0 mm. The body is covered with long scattered hairs. Wings are absent and the elytra abbreviated. A tympanum is situated on the outer surface of the anterior tibiae. The posterior tibiae have long, slender, movable spines, and the first joint of the tarsi is smooth above. These last two characters separate these insects from the other Gryllidae. The male is a little smaller, its elytra more developed and overlapping, the right over the left. When stridu-

lating the elytra are slightly raised and drawn across one another. The sound produced is not very loud; I cannot hear it at more than two yards. It is said that in some of the American species the stridulation is much more rapid during courtship than at other times, but I have not noticed any difference in our *N. sylvestris*.

On one occasion I noticed on one of my insects a white sphere about 1.5 mm. in diameter. This I at first thought was a spermatheca on a female but on closer inspection I found the insect to be a male with the sexual organs exposed. On looking up the literature of the subject I found that Fulton had described this in an American species. He also described their mating, and points out that the female feeds upon the spine that is on the inner surface of the posterior tibiae. No such spine is found in our *N. sylvestris*.

I first obtained ova of this cricket in August 1922 and asked the late W. J. Lucas if he could tell me when I might expect them to hatch. He replied that the ova had never been described but he thought they would hatch in about a month. I gave him some ova and he described them in the "Entomologist" for 1923. I kept the ova for some time but as they did not hatch I concluded that they were infertile and threw them away. During the next few years I frequently obtained ova but they never hatched. Then one year I forgot all about them and in the following June I saw young nymphs in the cage. Since then I have, each year, been able to obtain the young by keeping the ova until the following May or June. This proves that the eggs are laid in August and September and do not hatch until May or June. The young nymphs seen during the autumn are from the ova of the year previous. Full development of the insect, ova to ova, is two years. The ova are deposited in the earth just below the surface, in an upright position. They are creamy white in colour, cylindrical with hemispherical ends, one end being slightly more pointed than the other. They vary in length from 1.75 mm. to 2.0 mm., the diameter being 0.5 mm. The long axis is somewhat curved. The surface of the egg looks smooth but when examined with a lens is seen to be finely reticulated.

The true Oxlip is one of the most local of plants, but is very abundant where it occurs. It is found only on the high ground where the counties of Essex, Cambridge, Suffolk and Hertford meet. Its main distribution is to the East of Cambridge where it forms an irregularly crescent-shaped area about forty miles long, narrowest in the middle where it is about five miles wide. A smaller area to the West of Cambridge is about ten miles long by five miles broad.

Within the Oxlip areas no primroses are to be found, but at the border line the two species hybridize freely. For some unexplained reason the primrose is gradually encroaching upon the Oxlip, so that some woods which formerly contained Oxlips only, are now fully occupied by primroses.

The Oxlip differs from the Cowslip in having the corolla funnel-shaped and drooping, not saucer-shaped and erect, in being without the darker centre, and the throat being without the folds which are characteristic of both Primrose and Cowslip.

Wherever Cowslips occur together hybrids are fairly frequently found and are commonly called Oxlips, but they are easily distinguished from the true Oxlip by having the darker centre and folded throat common to both parents. They are very variable, some being nearer to one parent than to the other.

A. W. DENNIS.



THE TRUE OXLIP.

Photo. A. W. Dennis.

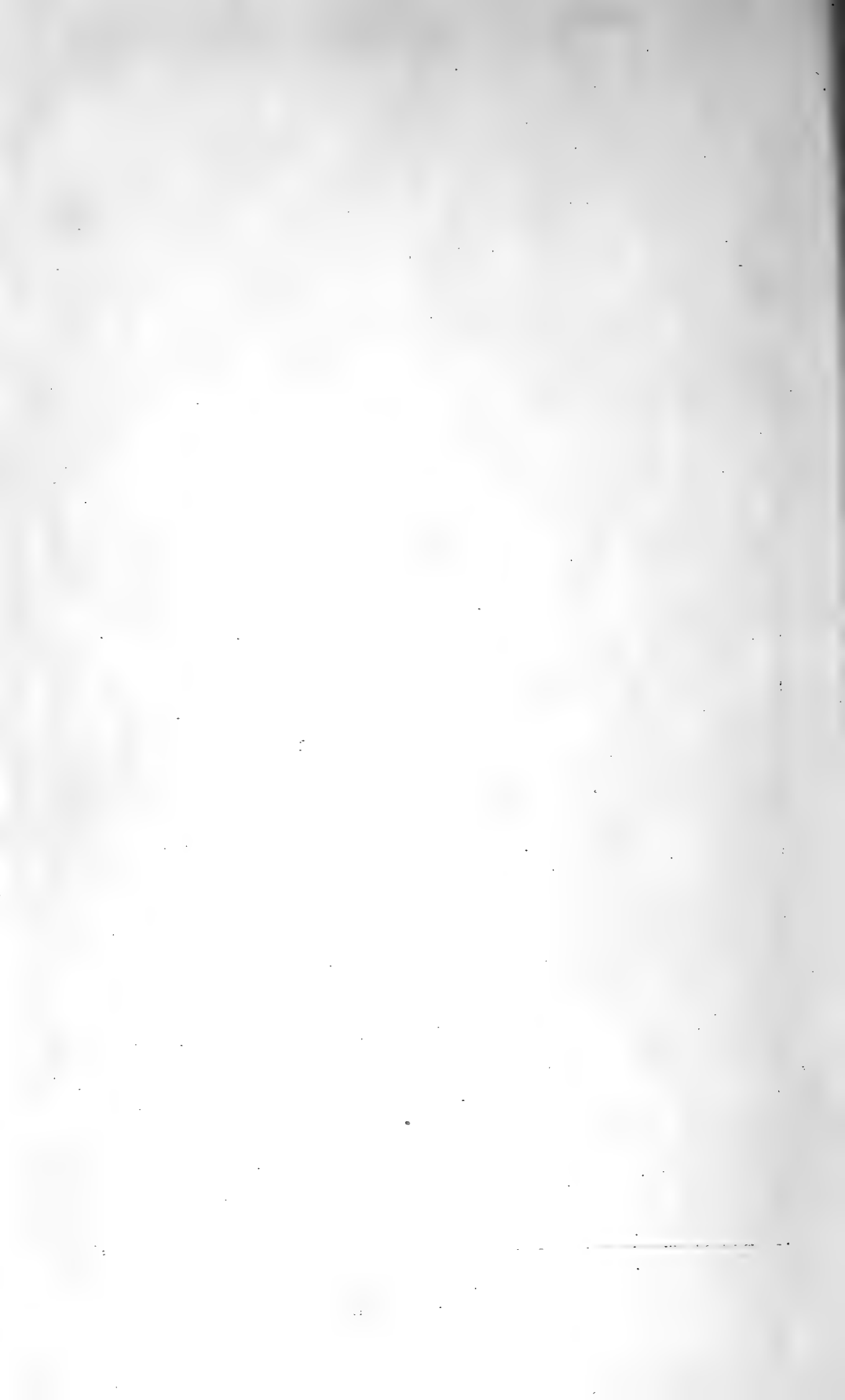
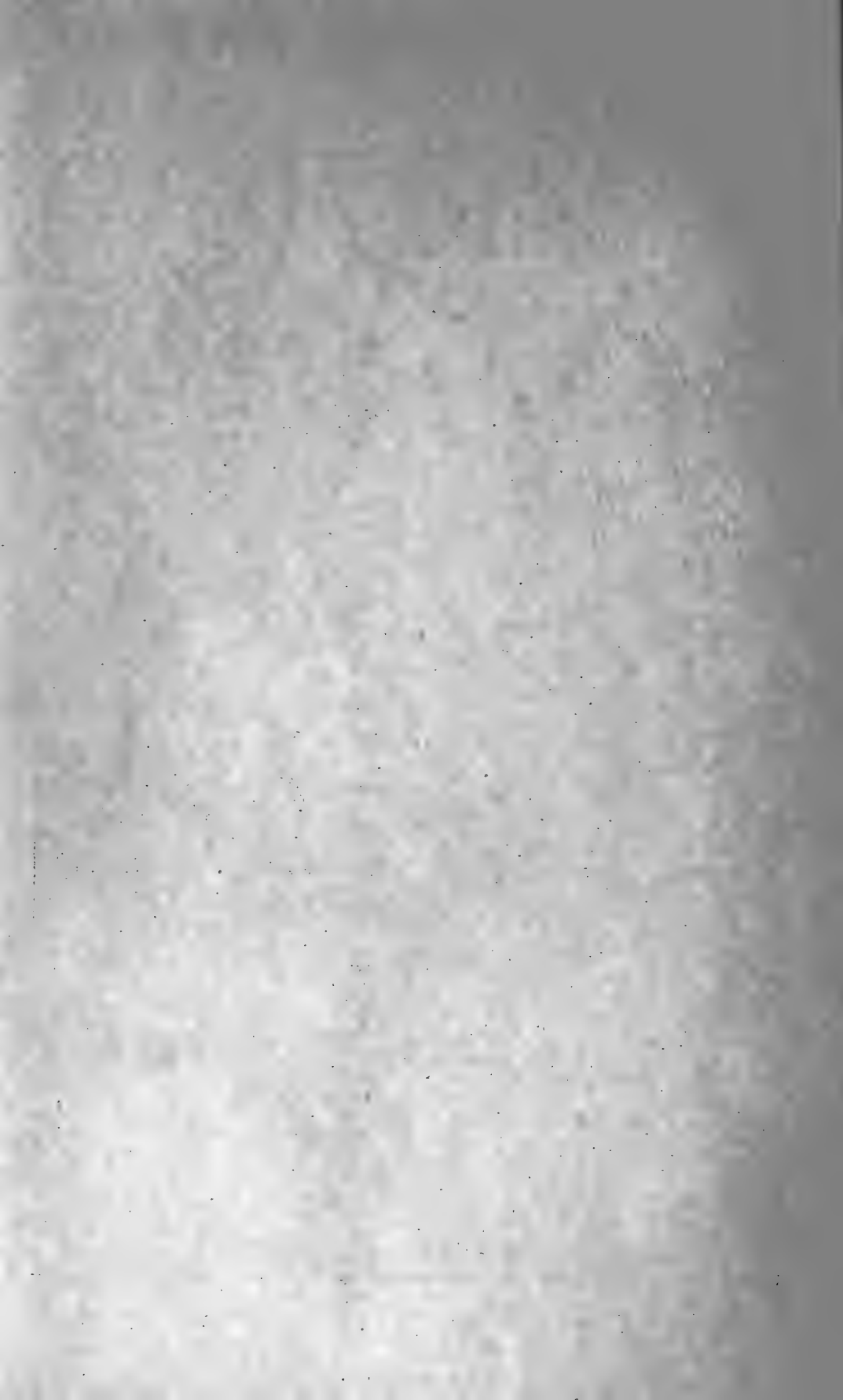




Photo. A. W. Dennis.

HYBRID (PRIMROSE \times COWSLIP) FREQUENTLY MISTAKEN FOR THE
TRUE OXLIP.



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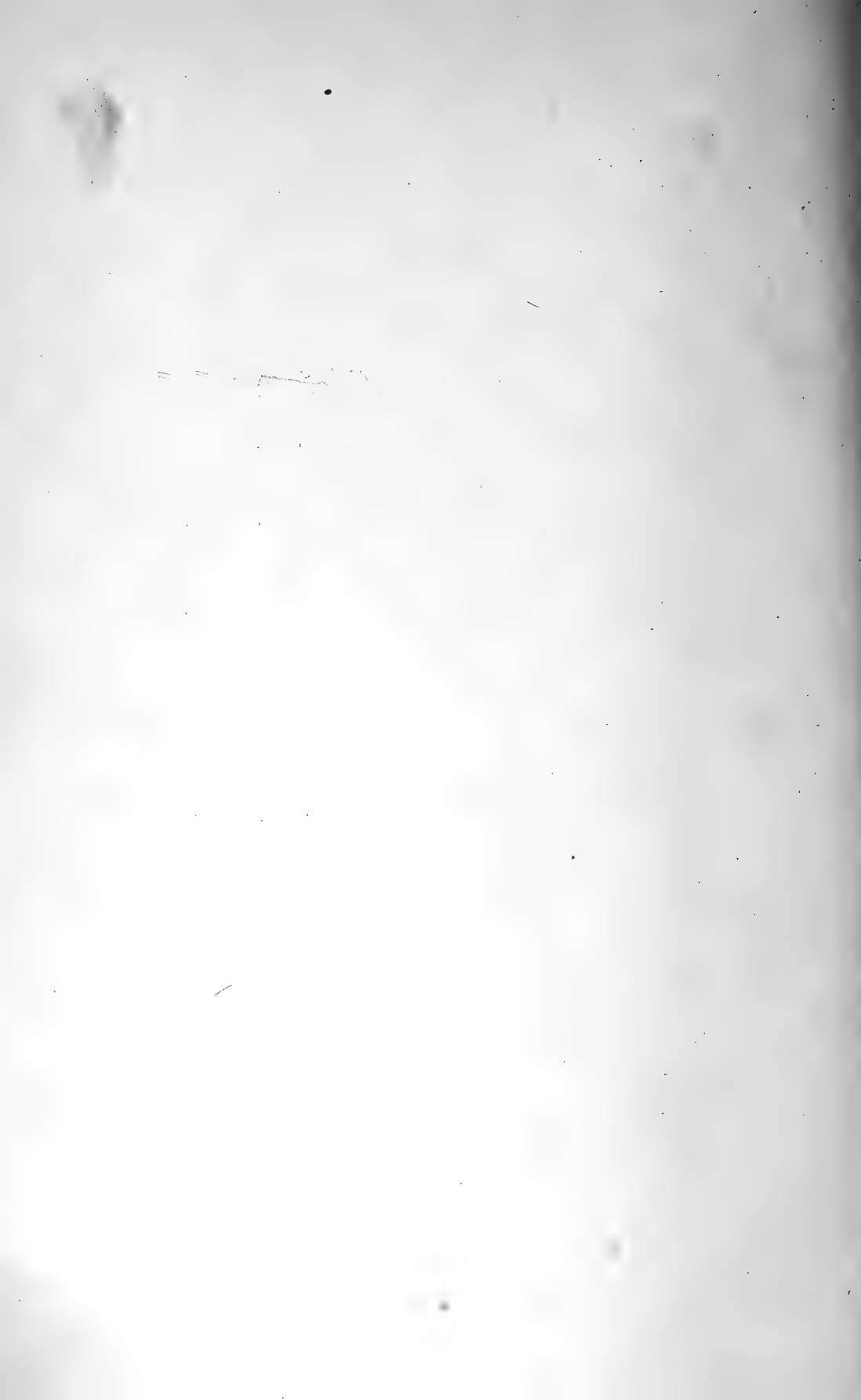
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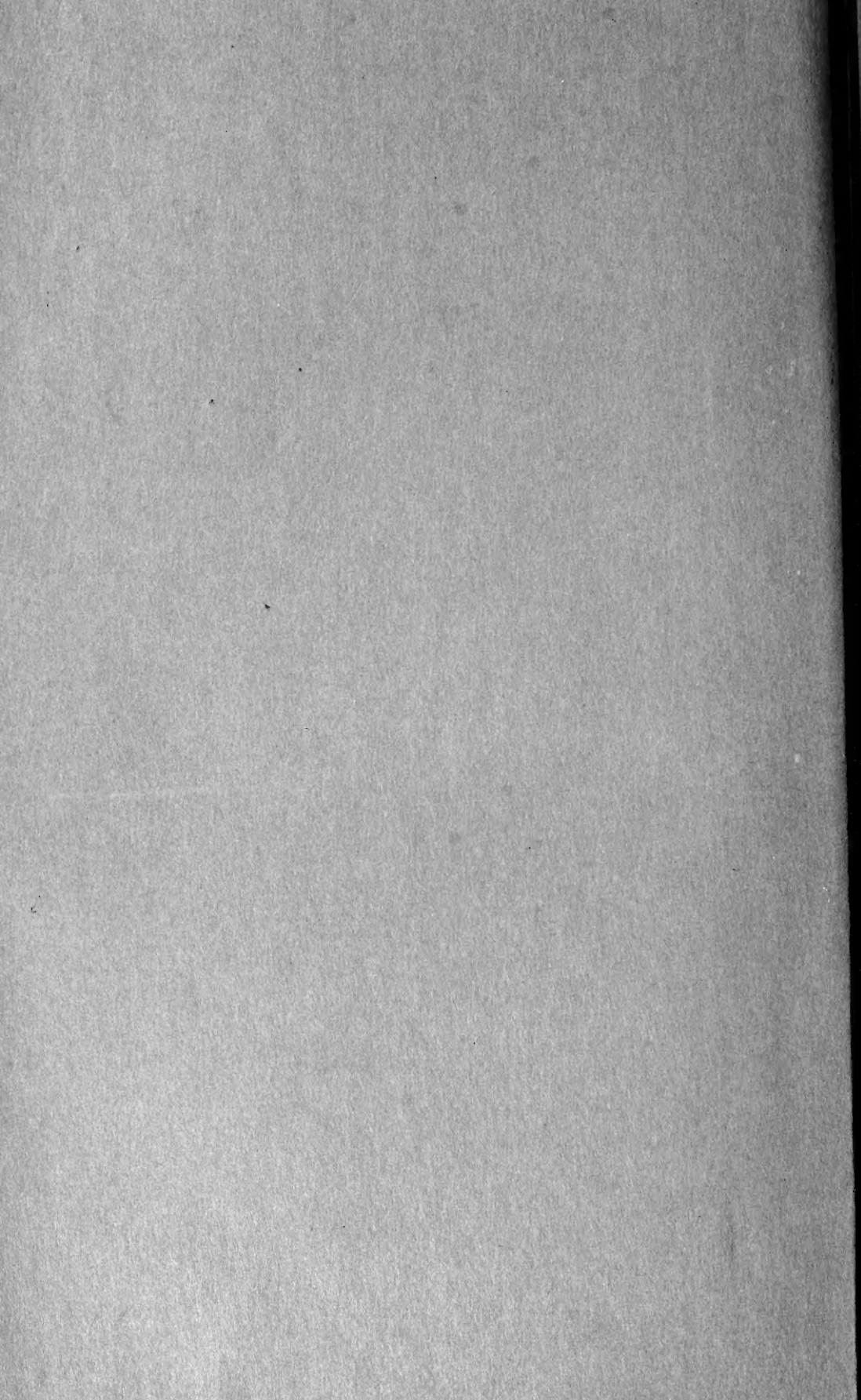
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